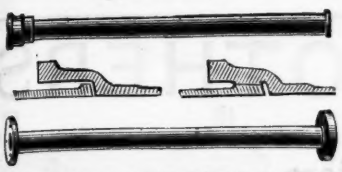
THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXVII. No. 1720.] LONDON, APRIL 28, 1896. [48TH YEAR. PRICE 6d.

GAS AND WATER PIPES

1½ to 12 IN. BORE.



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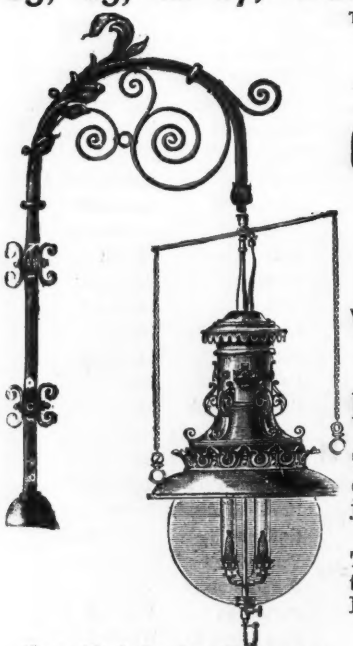

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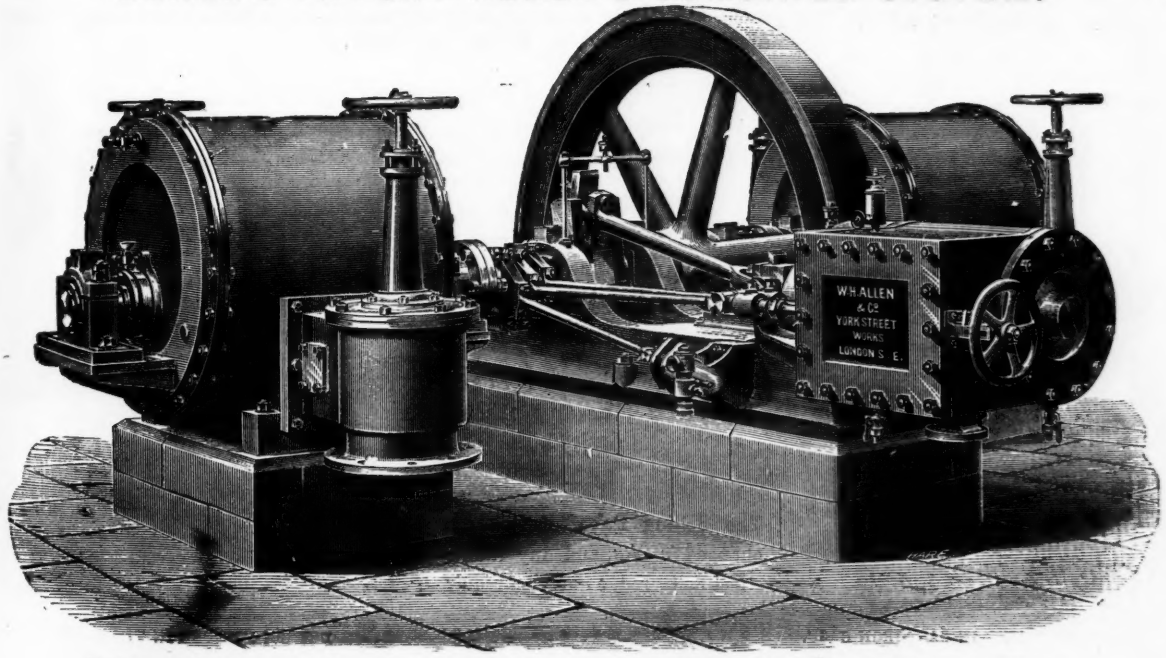

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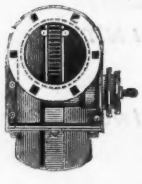

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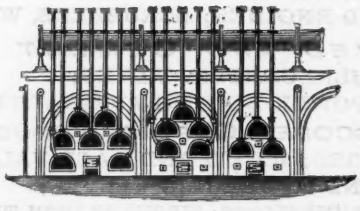

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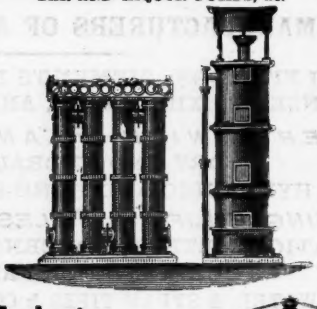

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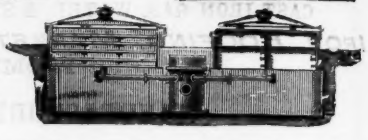

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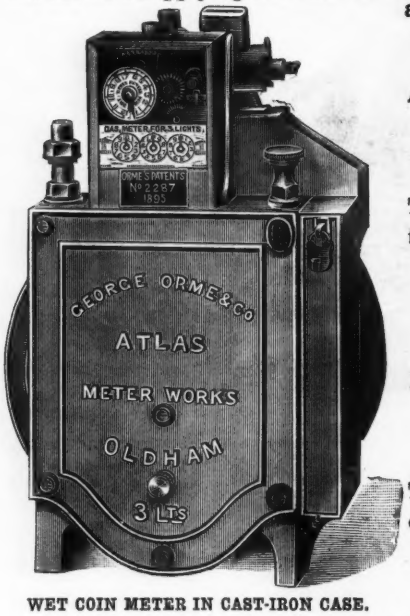

WET COIN METER IN CAST-IRON CASE.

A large number of these Meters are in use, and giving satisfaction.

The Mechanism is very simple; and there are no springs or complicated parts to get out of order.

We supply them to work with **1d., 1s., or any other Coin desired.**

The Selling Price of Gas can be changed *in Situ*, and any number of feet delivered, as may be required.

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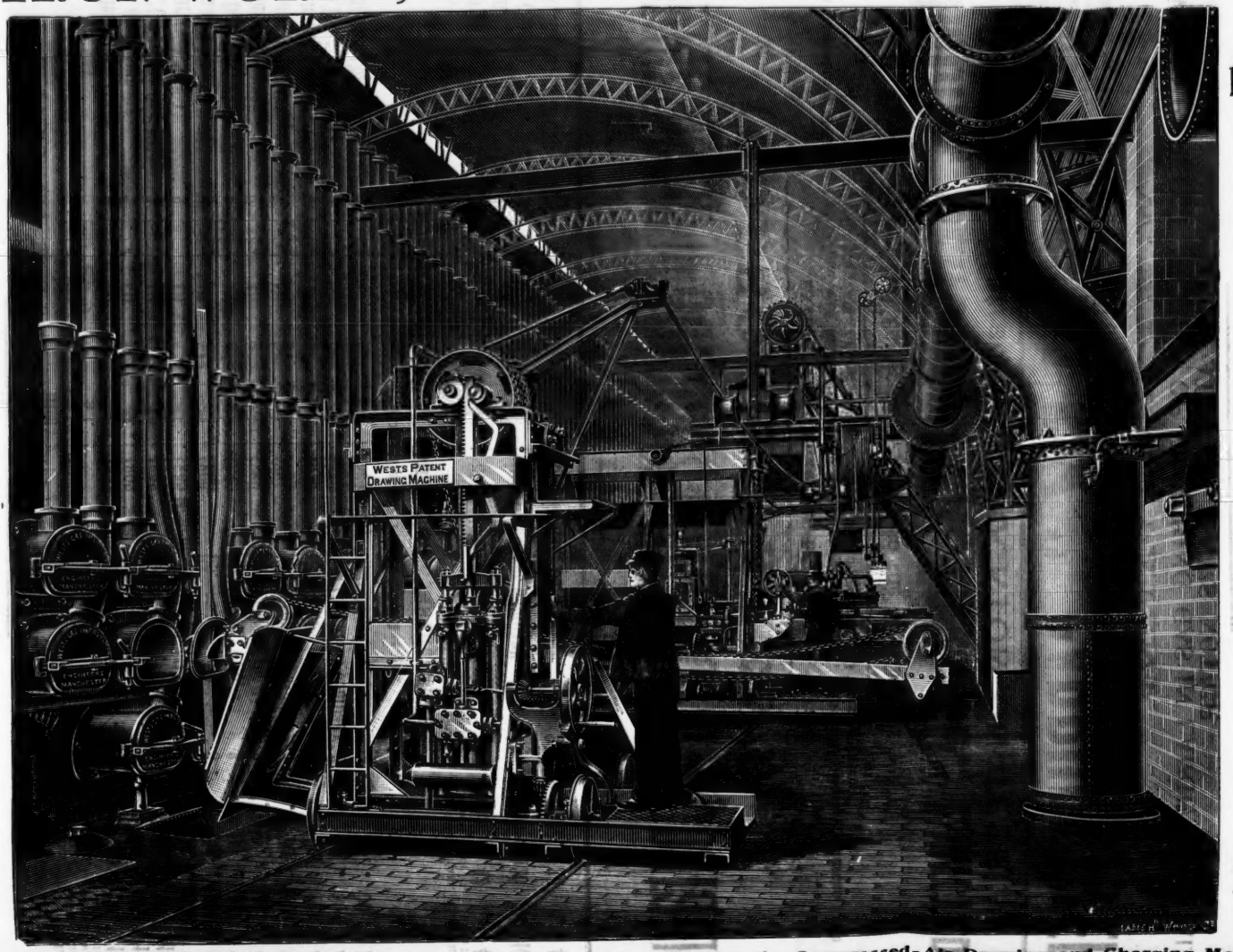

Interior of Retort-House at the Bradford Road Gas-Works, Manchester, showing the Compressed-Air Drawing and Charging Machines.

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DAILY

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Sole Makers of their **PATENT GASHOLDERS**, guided by **WIRE ROPES**, in place of old-fashioned and expensive Framing. For Testimonials, see Advertisement last week and next week.

LIST OF A FEW OF THE ROPE-GUIDED HOLDERS:—

DATE.	NAME.	No. of Lifts.	Lifts with Ropes.	Diam. in Ft.	Height in Ft. when full.
1894	Middlesbrough Corpn.	3 & Tank	All	184	120
1894	Sligo Gas Company	3	All	50	54
1891	Cie L'Union des Gaz Milan	2	All	116	46
1892	Bathurst (N.S.W.)	2	All	82	36
1895	Athens (Greece)	2	All	64½	42
1890	Tyne Dock Gas-Wks., N.E.Ry.	2	All	71	42
1890	Newburn-on-Tyne	2 & Tank	All	47½	52½
1894	St. Austell Gas Company	2	All	34	34
1894	Birkenhead Corpn.	4	2 Top	160	120
1894	Cape Town (S. Africa)	3	Do.	50	48
1892	Nottingham Corpn.	4	1 Top	100	100
1892	Nottingham Corpn.	4	1 Top	90½	100
1893	Do.	4	Do.	90½	100
1893	Do.	4	Do.	90½	100
1890	Manchester Cor. (Gaythorn Wks.)	3	Do.	130	90
1890	Do. Do.	3	Do.	100	75
1890	Do. Do.	3	Do.	100	75
1889	Do. (Rochdale Road)	3	Do.	100	75
1891	Darlington Corpn.	3	Do.	100	73½
1895	Barrow-in-Furness	2	Do.	100	41
1889	Haslingden Union Gas Company	2	Do.	80	44
1894	Selby Local Board	2	Do.	50	36

Numerous Single-Lift Holders.

THE FOLLOWING ARE IN COURSE OF CONSTRUCTION:—

NAME.	No. of Lifts.	Lifts with Ropes.	Diam. in Ft.	Height in Ft. when full.
Falkirk Corpn.	2 with Cup & Tank	Both	130	40
Perth Corpn.	2 Do.	Do.	125	50
Barcelona (Spain)	2	Do.	98½	52
Perth (W. Australia)	2 & Cup	Do.	75	40
Stone Gaslight Company	3	All	42	48
Derby Gaslight Company	4	Top	125	102
Birmingham Corpn.	2	Both	80	40

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Improvements in Sulphate of Ammonia Apparatus

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EXTRACT FROM ENGINEER'S REPORT—

"I can now obtain 60 Tons of Sulphate of Ammonia per week with 'Colson's' Still, using ONE Boiler, whereas, with my former continuous plant, TWO Boilers were required to produce 40 Tons per week."

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W. E. PRICE'S PATENT.

A NEW AND PERFECT METHOD OF ENRICHING GAS IN LARGE OR SMALL QUANTITIES AT A MOMENT'S NOTICE.

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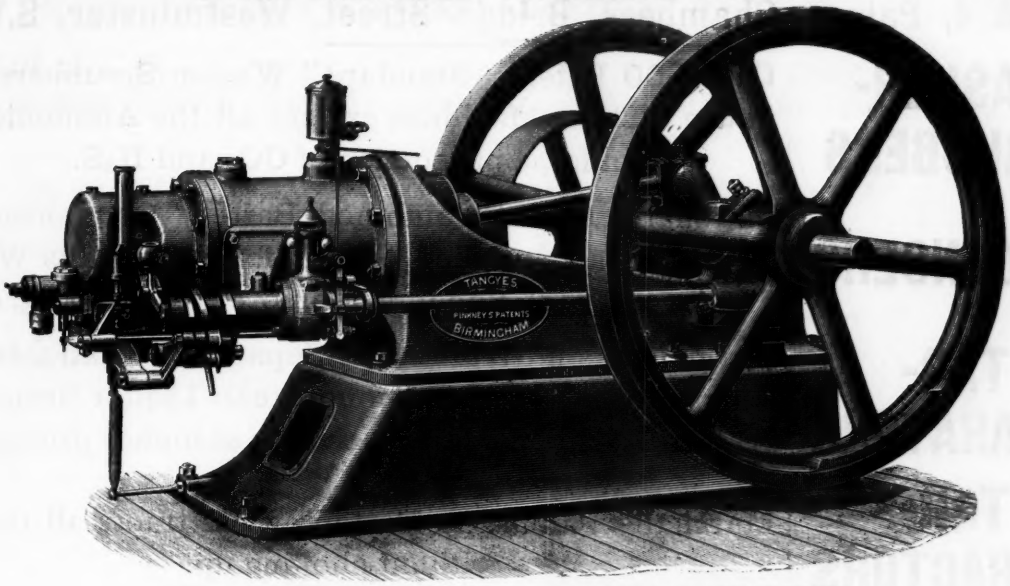

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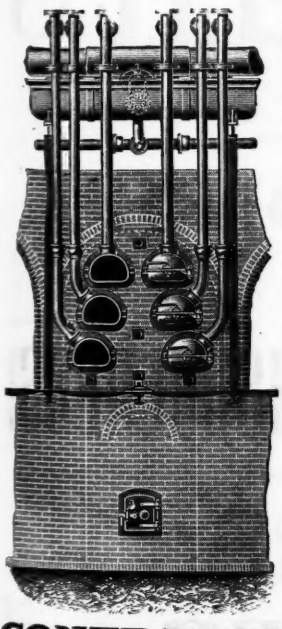

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SUITABLE FOR

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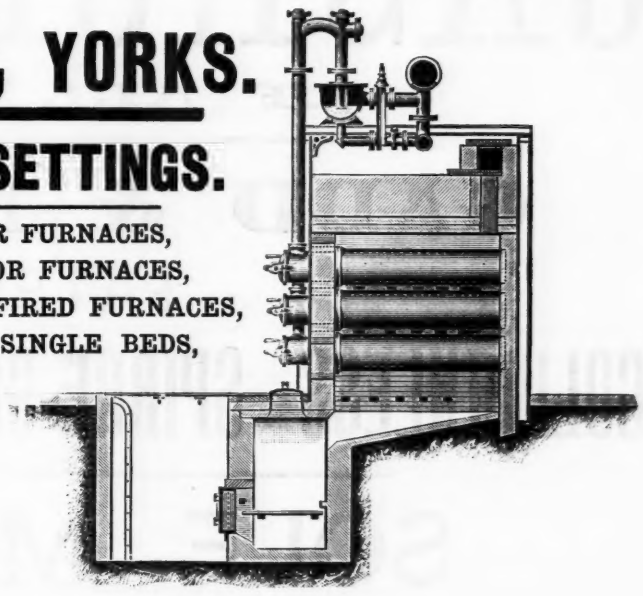

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GIVING THE HIGHEST WORKING RESULTS, THE MOST PERFECT HEATING, GREATLY INCREASED DURABILITY, THE LOWEST FUEL CONSUMPTION.

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WASHER-SCRUBBERS — Over 500 Patent "Standard" Washer-Scrubbers now in use. These Machines extract all the Ammonia and a large proportion of CO_2 and H_2S.

CONDENSERS — Marshall's Patent Combined Battery Condenser and Scrubber, as supplied to the following Gas-Works: Coventry (3), Randers, Elsinore, and Aalborg, &c.

TAR-SEPARATORS — Burmeister and Wain's Tar-Separator. Extracts over 99 per cent. of the Ammoniacal Liquor from Tar, rendering the latter saleable at higher prices.

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Prices, &c., on application to the above.

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HIGHEST EFFICIENCY WITH GREATEST ECONOMY.

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INCANDESCENT GAS-LIGHT

Which has now been successfully adapted to the purposes of

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THE DIFFICULTIES CAUSED BY VIBRATION HAVING BEEN OVERCOME BY THE USE OF A SPECIAL BURNER, WHICH GIVES HIGHLY SATISFACTORY RESULTS.

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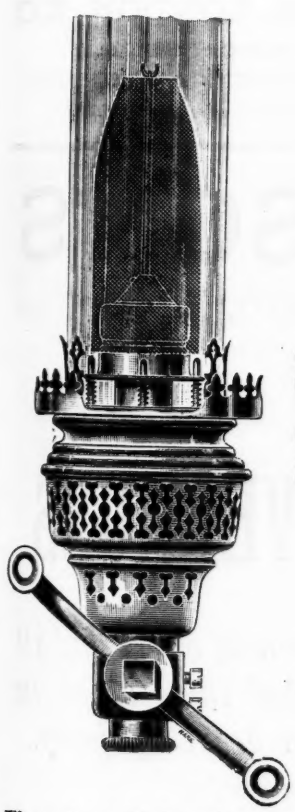

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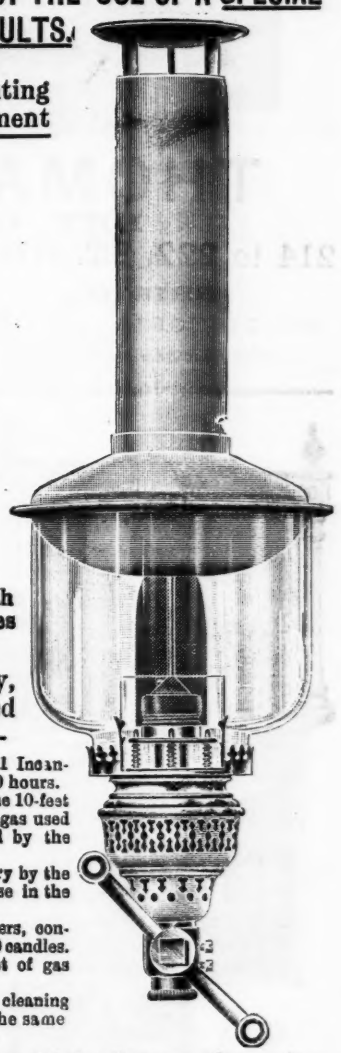

The INCANDESCENT GAS-LIGHT has been tried with most satisfactory results for Street Lighting purposes in many Towns throughout the United Kingdom.

The Lighting Engineer of the Kensington Vestry, in a report dated the 14th of May, 1895, addressed the Works and Sanitary Committee as follows:—

(1) During the months of January, February, and March, 1895, 31 Incandescent Gas-Lamps were in use for an average period of 1167·89 hours. The estimated quantity of gas that would have been consumed by the 10-feet flat-flame burner was 11,678 cubic feet. The actual quantity of gas used by the Incandescent Gas-Light Company's Burners, as recorded by the meters, was 4415 cubic feet.
After allowing for the extra cost of up-keep, the gain to the Vestry by the use of these burners was £20 3s. 4½d., and a large increase in the Illumination of the Street.

(2) The illuminating power given by the Incandescent Gas-Burners, consuming 3·78 cubic feet of gas per hour, was found to be equal to 60 candles. That given by the flat-flame burners, consuming 10 cubic feet of gas per hour, was 26 candles.
The lanterns fitted with Incandescent Burners only require cleaning 9 times in 90 days, as compared with 26 times' cleaning in the same period required with the lanterns filled with flat-flame burners.

The net result therefore appears to be that, by the use of the Incandescent Gas-Light System, the saving effected is 15s. per lamp for this quarter, after paying for the up-keep of the Burner, and at the same time more than double the light is obtained. It must be noted, however, that these results were obtained with the ordinary burners, and not with the improved burners with the anti-vibration springs. With the latter, the expense of up-keep would be materially reduced, and the saving consequently increased.

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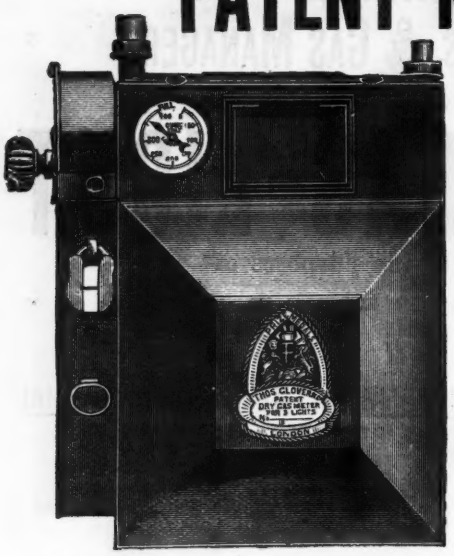

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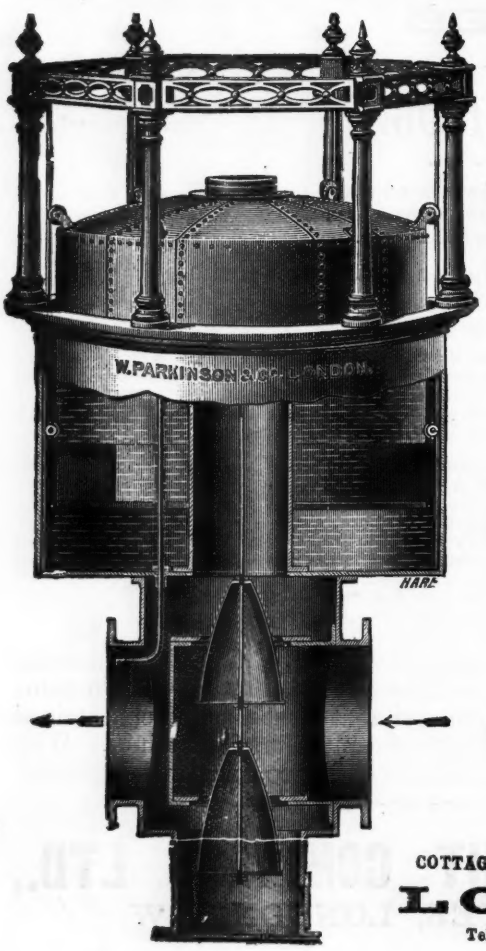

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EDITORIAL NOTES.

The South Metropolitan Bill in Committee.

THE South Metropolitan Gas Company's Bill was before a House of Commons Committee last week; and the proceedings will be found in our "Parliamentary Intelligence" to-day. Briefly stated, the Company get their desire in respect of stock unification and conversion upon the proposed 4 per cent. basis; but the Committee would not alter the old auction clause arrangements in the manner asked for, which would have put the consumers and the employees of the Company in a more favourable position than the general investing public. Also, the qualification of the workman-director was increased to £250 of the new consolidated stock, to be held by him in his own right for twelve months before his appointment on the Board, in accordance with the scheme of the promoters. This alteration appears to strike heavily against the scheme, the conditions of realization of which are thereby rendered more difficult, so far as the workmen in the Company's service are concerned. The officers stand a better chance of being qualified for a seat at the Board; but we do not know whether an officer-director would be accepted as realizing the ideal of binding the Company and their employees in a more indissoluble union than at present exists. The Committee do not appear to have been greatly enamoured of the idea; and they have left the Bill in a shape which probably does not greatly please Mr. George Livesey. There can be no question, however, as to the benefit to the Company that will accrue from the consolidation of their stocks. It will be a little awkward at first to have to adjust one's view of the Company's finances to the new focus. But the change is one that the other Metropolitan Gas Companies are bound to copy whenever they have the chance; and this will restore the old facility of capital comparison now for the time being destroyed. Meanwhile, even the new South Metropolitan stock will stand at a premium, seeing that purchasers in the open market can only obtain something like 3¾ per cent. return for their money. This appreciation of what is, after all, only the stock of a trading concern, exposed to some, if not to all, the risks of trade, can hardly go much higher.

The opposition to the Bill offered by the London County Council was half-hearted, and was singularly misdirected. Mr. Worsley Taylor, Q.C., led for the Council, and cross-examined the Chairman of the Company; but he was evidently hampered by what were probably his instructions—not to imperil the passing of the Bill, while doing all that was possible to prevent the Company from benefiting by it financially. The Council favoured the workman-director proposal; but, warned by last year's experience, they knew that, if they opposed the financial clauses too fiercely, the whole measure might be withdrawn. Consequently, Mr. Worsley Taylor was constrained to give a milder repetition of his performance of last session, when he solemnly warned the Committee against disturbing, at the desire of a particular Gas Company, the parliamentary bargain entered into with all the London Gas Companies so many years ago. Whether it was that the repetition was not equal to the first rendering, or the solicitude of Counsel not to say too much weighed upon his oratorical powers, the net effect of the opposition was as disappointing to the Council as to the Company. For if the promoters were prevented from taking the steps they contemplated for amending the auction clauses in the interest of the undertaking and of the consumers, the opposition had likewise the mortification of seeing the workman-director almost capitalized out of possibility of materialization. After all, it may be that the alterations made by the Committee in the Bill will not hinder the execution of the plans of the promoters. They can go on distributing stock in small parcels among their consumers and employees, as they have done for years past; and it was never known yet, in the records of company administration, that the question of qualification stood in the way of a Board getting a particular colleague whom they specially wanted. It does not, at any rate, lie in the mouth of a "guinea-pig" to gibe at a "workman-"director" on this score.

The North of England Gas Managers' Association Meeting.

THE members of the North of England Gas Managers' Association met in Newcastle-upon-Tyne last Saturday,

under the presidency of Mr. Herbert Lees, of Hexham. Mr. J. H. Penney, of South Shields, read a paper on "How to Minimize Bad Debts;" and Mr. H. Tobey, of Malton, another on "Elusive Leakages from Main and "Service Pipes"—both highly practical subjects, from the close study and rational discussion of which much information is to be derived. The text of the papers will be found elsewhere. Mr. Penney's treatment of his topic was characterized by a pleasing lightness of touch which prevented his matter from descending anywhere into the dulness which is the besetting evil of administrative questions. A good deal of his matter was necessarily concerned with points of office detail, which vary in different places; but he laid down some principles of general applicability. There is no doubt that the intangible, but at the same time perfectly recognizable, quality known as "popularity," possessed by some Gas Companies—not, perhaps, forming the majority—depends very largely upon the public sense of the manner in which consumers are treated by the officials with whom they come into contact. It is quite true, as Mr. Penney says, that "among the many applicants "for a supply of gas, there are some who cannot pay, and "others who never intend to do so." Tact is needed in dealing with these and all other representatives of that many-sided creature known collectively as "the public;" and this is the quality that runs the greatest risk of being discouraged and neglected in the office of a statutory supply undertaking of any description. So it is that the names of some Gas Companies are not highly honoured in their own districts, with the result that, when the day of reckoning with Parliament comes, the interests of the proprietary suffer. Mr. Tobey's paper contains some very suggestive observations upon, and statements of, the author's experience in the troublesome duty of seeking out leakages of gas; and it introduced the Redwood and Clowes gas detector for the first time to a gas engineering auditory. The new President of the Association is Mr. Penney; and many friends of the Association will hear with regret that Mr. W. Hardy, sen., who was one of the founders, and has all along occupied the position of Honorary Secretary and Treasurer, has determined to finally retire from further participation in the management.

Coin-Meter Users Liable to Summary Process.

A SHORT time ago, we commented upon the occurrence of an "unpleasantness" in the West Ham district, which arose out of a regrettable discrepancy between the contents of a coin-box attached to an automatic prepayment gas-meter and the registration of the index of the meter. The consumer chose to consider that if the meter passed more gas than he had paid for, this amiable weakness on the part of the instrument was something of which he was perfectly entitled to take advantage; while, in the last resource, he argued that any money that he might be found to owe to the Gas Company on this account could not be recovered by summary process. These were somewhat grave contentions—so much so that the Magistrate before whom the proceedings were taken took a fortnight to consider his decision, which we have since reported. This was to the effect anticipated all along, in so far as the consumer's liability to pay upon the registration of the ordinary index was concerned. There was, as we had expected, a special agreement, under which the registration of the ordinary index was to govern the question as to the quantity of gas consumed, without reference to the amount of money contained in the cash-box. Upon the second point also, which was somewhat more debateable, the Magistrate decided in the Company's favour. It was contended that summary proceedings in a Police Court can only be taken to recover an amount due for gas supplied at the ruling price, not for any extra charge, as that for rent of fittings. The West Ham Magistrate, however, finds that the process prescribed for the recovery of gas-rents is equally applicable to other subsidiary charges which under the Gas-Works Clauses Act, 1871, a gas company are authorized to make to the consumers. So this legal quibble has failed of its effect, and what might conceivably have proved a troublesome obstacle in the way of the popularization of gas by the coin-controlled meter is adjudged to have no real existence. As was reported last week, the judgment of the West Ham Stipendiary has since been corroborated in regard to its legal bearing by Mr. Lane, Q.C., the Magistrate sitting at the South-Western Police Court.

Coal from Kent.

THE intelligence that the Kentish coal-field is actually to be opened up by the sinking of a pair of 20-feet shafts at Hougham, near Dover, is deserving of more than passing consideration on the part of those who are interested in the coal, gas, and coke industries of the South-East of England. The financial and other newspapers had paragraphs on this subject last week, from which it is to be gathered that the enterprise is in the hands of the Kent Coal-Fields Syndicate—a body with a fully-subscribed capital of £200,000—who intend to equip the pits with all appliances for an output of 2500 tons a day. This, of course, indicates a first-class colliery; and the starting of such a concern in a new neighbourhood means bringing to pass a good many very curious direct and incidental results. The trial borings have been carried down to a depth of 2177 feet, where a 4-feet seam of what is described as bright, bituminous coal was found; and with this the exploration stopped. Several other seams, about 2 ft. 6 in. thick, were passed through before this goal was reached; so that there should be no lack of material to go on with. As for the quality of the coal found, the reports are only too favourable, since it is described as coking well, and as possessing a heating power superior to that of either Newcastle or Welsh coal. The estimated cost of putting the Kentish coal into railway waggons at the pit's mouth is 6s. per ton; so that there should be a wide margin for profit in supplying the local consumption. An electrical contemporary has congratulated the Dover Electric Lighting Company upon the prospect of cheap fuel offered by this new venture. But the felicitation is obviously unfounded, inasmuch as if the new coal supply is good for anything, it is the local Gas Companies and their customers who will derive most benefit from it.

The Coal Miners and Conciliation.

IT is announced that at a meeting in Manchester last Saturday of the Lancashire and Cheshire Miners' Federation, reports were received from all the districts represented in the Federation favouring the men's proposal that the agreement now in existence between them and their employers should be continued until August, 1898. It was also resolved "that the rate of wages remain as at "present until January, 1898, and from January to August, "1898, the Board of Conciliation to have full power to "advance wages, as the existing agreement provides for, "up to 15 per cent. higher than the present rate." This is a pretty good indication of what the Federation believes "conciliation" to consist—an arrangement for the maintenance of wages at a given level, irrespective of market considerations, with exception only for an increase. Not a sign appears from this report to show that the Miners' Union has any knowledge of the downward tendency of coal prices, and still less that the leaders have cognizance of the disturbing incident of the pending stoppage of one of the Marquis of Londonderry's oldest pits, on account of the loss attending its working during the past year. The worst of this carefully-assumed blindness to the most obvious truths of the situation in the coal trade, is its augury of resistance to any proposal emanating from the employers, who cannot afford to run their heads in the same way against hard facts. A Conciliation Board in an industry is in theory a good thing; but its continuation in existence implies a willingness on both sides to be conciliated, which is a condition that seems to be wanting on the part of the federated coal miners of Lancashire and Cheshire. It is sometimes urged as a plea for Trade Unions that employers can negotiate better with organized than with independent labour; but where the organization ignores the facts with which employers of labour have to reckon, this presumed advantage does not appear.

Qualification of Engine Drivers.

A DEPUTATION ostensibly representing persons in charge of steam-engines and boilers, of the land or stationary order, visited the Home Office one day last week with the object of asking the Home Secretary to use his influence in pressing forward the Engines and Boilers (Persons in Charge) Bill, now before the House of Commons. The spokesmen for the deputation stated that it represented upwards of 20,000 "organized" workmen, who merely asked—of course, only in the public interest—that persons in charge of engines and boilers should be forced to satisfy some competent board of examiners as to

their ability to take care of such machinery. The Home Secretary, however, was able with little difficulty to see through the artless speeches of these public-spirited gentlemen; and, though he did not say as much, he was probably perfectly aware that the proposed requirement was only a Trade Union dodge. What he did say was that, apart from the case of collieries, he should require to be convinced that such an examination as was suggested would afford any more adequate guarantee against accident than the public already enjoy. He was "not particularly "sanguine nor convinced of the necessity for the Bill;" nor would any other sensible person be, unless there were some ulterior object to be gained by it. Who is to be guaranteed against "accident," or to be relieved from legal responsibility, by a board of examiners of drivers of stationary engines? The motive of the framers of the Bill is in reality to form a preserve over which yet another Trade Union executive might exercise despotic sway. No stoker in a gas-works could, in such an eventuality as the passing of the Bill, touch an exhauster-engine; and nobody but a certified man could start or stop a steam-pump. What would be done with gas or petroleum engines, or hydraulic cranes and capstans, does not appear. The whole project is, in short, absurd. But, unhappily, this does not, in the existing state of political parties, hinder a number of highly respectable Members of Parliament from lending their names to it.

WATER AND SANITARY AFFAIRS.

The Metropolitan Counties Water Board Bill stands for its second reading on Thursday next. On that occasion, Lord Wemyss intends to move, according to the notice which he has given, that, for certain specified reasons, "legislation such as is proposed in the Bill is uncalled for "and impolitic." Should this amendment be negatived, Lord Tweedmouth will move the rejection of the Bill; and he is prepared to divide the House on the question. The Middlesex County Council have resolved on the singular course of sending a deputation to Lord James of Hereford, urging that London should have its own water system, that the surrounding counties should be left to deal with the supply in their own areas, and that no more water should be taken from Middlesex.

The objections formulated by Lord Wemyss in his amendment opposing the Water Board Bill are founded on the report of the late Royal Commission, in which it was declared that the water supplied to London by the Companies was "of a very high quality for domestic "purposes," and also that the present and readily available sources were sufficient to supply 35 gallons per head daily to a population of 12 million persons. As the present population of "Water London" is considerably less than half that number, it certainly cannot be argued—except in defiance of the Royal Commissioners—that there is any urgent need to introduce a fresh supply. But when bringing forward the Water Board Bill, it was explained by Lord James that the Government had framed their measure upon the assumption that there existed "a great and "growing opinion" that the time had come when the water supply of the Metropolis and surrounding districts should be vested in the hands of "a responsible and a public repre-"sentative body." It was further explained by Lord James that this assumption was not founded on the view that the Water Companies had neglected their duty. It was only that it seemed "somewhat anomalous that interests so "vast should be placed in the hands of trading Companies." The *raison d'être* of the Bill is thus entirely outside the resolution moved by Lord Wemyss. Whether the *raison d'être* is sufficiently good and valid may be doubted. The Government have yielded to two influences—the clamour of the Progressives for a public authority; and the general distrust felt by the ratepayers with reference to the County Council.

The main question very readily divides itself into two parts—the water supply, and those who have charge of it. With the question of administration, the Royal Commissioners had nothing to do. Their inquiry had reference to the supply in its physical aspect; and concerning this latter, their report is conclusive. With respect to the former, nothing is gained by an appeal to the report, except by inference. Yet the inference seems clear enough. If the supply is what it ought to be, why place it in fresh hands? The amendment of which Lord Wemyss has given notice clearly suggests this argument; and it should be distinctly understood that, whatever may be the merits of the Water Board Bill, it is simply framed to fulfil the *doctrinaire* demand that the water supply shall be in the hands of a public authority, quite irrespective of any practical consideration as to the quality of the supply and the amplitude of its provision. Lord Wemyss' motion is perfectly right; and the fact that it goes wide of the mark that has been set up helps to prove that the mark itself has been placed outside the limits of the practical. As even a Water Board cannot be created and worked without giving rise to a certain amount of expense, so all the extra cost incurred in its constitution and management will simply be a sacrifice to an idea.

The report of the Water Committee of the County Council on the scheme of a Welsh supply for London came up for discussion on Tuesday last, after frequent adjournments. The Progressive party claim to have gained a victory in the debate which ensued; and we are told that "the County Council is only doing its duty to "the people of London in proceeding with the Welsh "scheme." We hardly understand how the scheme is to proceed in the face of that which transpired last Tuesday. Certain declaratory resolutions were then passed in favour of the project for getting water from Wales; but the two recommendations of the Committee which proposed that something should be done were withdrawn—it being understood that a further report on the subject would be brought up. One of the recommendations was that the Water Committee should be instructed to continue the surveys of the whole of the Welsh project, and to prepare such plans as were necessary in order to enable the Council to apply to Parliament next year for power to carry out the Usk and Llangorse section of the scheme, together with other matters. The second recommendation was that the Committee should be authorized to expend £10,000 in relation to the subject. The retreat beaten on these points scarcely looks like victory. The Committee asked that the Council should "now definitely adopt the "Welsh scheme," and empower them "to commence at "once the necessary plans." This was to act precisely as if the Government measure had no existence; and, of course, the request was framed at a time when the Water Bill had not made its appearance. The Council could not take quite so irrational a course. Hence they did not "definitely adopt" the Welsh scheme, but they went as far as they could, and in a certain way approved it—showing sufficiently what they would like to do. They decided that the water supply of London should be augmented from some other source than the Rivers Thames and Lea; also, that certain valleys in Wales furnished "a suit-"able area" from which such augmentation "might "be derived."

Scarcely in harmony with these restricted resolutions, the recommendation of the Committee was adopted that the Usk and Llangorse section of the scheme "should be undertaken in the first instance." This lies in the future; and it is not certain that it will ever come to pass. The most the Council can now do is to continue their investigations; and to this the Moderates were willing to agree, though the Council rejected Sir John Lubbock's amendment, which gave liberty for the Committee to go on with their inquiries. The truth is that the Water Board Bill has taken the question out of the hands of the County Council. However unpalatable the fact may be to the Progressives, Parliament has clearly shown that it does not intend that the Council shall be the Water Authority for London. The only consolation left is that which Mr. Charles Harrison suggested, when he said that, "after all, the proposed Trust would be more "or less a Statutory Committee of the County Council." This is a damaging criticism for the Water Board Bill, and gives force to the amendment by which Lord Wemyss proposes to get rid of that measure. London is not left uncared for, whatever happens to the Government Bill or the schemes of the County Council. The Bills brought forward by the Water Companies, unless unduly shorn, will provide the needful supply for many years to come. As will be seen by our "Parliamentary Intelligence," the Hybrid Committee having charge of these Bills has now been fully constituted; and it is expected that Sir Joseph Pease will be the Chairman.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 938.)

THE chief interest of the week has again centred in Consols, which on Monday reached the extraordinary price of 113⅞—thus early verifying our forecast. But a rapid decline set in; and on Saturday they were marked at 111⅜—a difference of 2½. So wide a fluctuation is in itself remarkable; but we cannot now pursue the interesting theme. Everything else, being unaffected by the same special causes, was buoyant; and prices throughout the list show a pretty general improvement. Business, however, was not very large; for, with the high prices of choice securities on the one hand, and the still hazy outlook of some of our political problems affecting more speculative sorts on the other, the position was not conducive to enterprise. In the Money Market rather better rates were obtained; but there is no substantial or permanent change. Business was fairly good in the Gas Market; and the tendency was very firm—buyers being more plentiful than sellers. Several of the leading stocks made more or less considerable advances in quotation. In Gaslights, the "A" was fairly brisk, and seemed disposed at first to make some material improvement—opening at 303½, and rapidly attaining 306½. But the rate of progress was not maintained; and the net gain in the week was only one point. Very little of the secured issues was offered. But it was readily taken up at big figures; and the quotations of the "F," "G," and "H" had a smart rise. Scarcely a deal was done in South Metropolitans, as if the fate of the Company's Bill in the Commons' Committee room was being awaited. The result should be satisfactory to the promoters, though they did not get all they asked for. Whether the stock will rise much, if at all, above the present value when it is put on a 4 per cent. basis, is a question. If the public choose to make it so, then it will. Nothing was done in Commercials, except one job in the old stock at a figure which sent the quotation up. The Surburban and Provincial division was noticeable only for a considerable advance in Brighton "A;" the rest being quiescent. There was a fair amount of business in the Continental Companies, which showed strength generally; and Imperial and Malta advanced in price. Among the rest, Monte Video had a further advance; but Buenos Ayres relapsed. Sydney debentures moved up a point. The Water Companies were, as a rule, firm; and there was a good demand for debenture stocks at nice prices.

The daily operations were: The Gas Market was rather quiet on the opening day at steady prices; quotations remaining unchanged. In Water, there was a rise of 2 in Chelsea and West Middlesex. Tuesday developed a good deal of activity in Gas, coupled with an extended disposition to advance in value. Brighton "A" improved 5; Imperial Continental, 2; Australian, 1; and Monte Video, ½. In Water, Chelsea had a further rise of 1; and West Middlesex, of 2. But Grand Junction fell 1½. On Wednesday, Gas was rather quieter; but the advance was maintained, with a rise of 2½ in Commercial old, 1 in Gaslight "A," and ¼ in Malta. Thursday was an active day; but nothing rose, while Buenos Ayres fell ½. Friday's business showed good, steady prices generally. Gaslight "F" and "G" gained 5 each; and ditto "H," 2. Saturday was quite devoid of feature; and the only change was a rise of 1 more in West Middlesex Water.

ELECTRIC LIGHTING MEMORANDA.

The Danger of High-Pressure Alternating Currents—A Mistaken Parallel—Mischief from Low-Pressure Continuous Currents.

A COMMUNICATION that may well be considered in some quarters as both disagreeable and uncalled for, was made last week to "The Times" by Mr. A. L. Fyfe, who appropriately wrote from Electric Avenue, S.W. Mr. Fyfe stated that, as he had always from practical experience contended that electric light and power can be more efficiently and economically supplied to towns and urban districts within a radius of five or six miles by using continuous currents, than by high-pressure alternating currents, he was "impelled," in order to settle as far as possible the question of danger, to write to the Board of Trade for information. In reply, the Department informed him that they had official cognizance of nine cases of fatal accidents to employees at generating or transforming stations where high-pressure alternating currents are used, but that no instances have been reported of similar fatalities in the case of low-pressure continuous currents. Mr. Fyfe hastened to publish this information for the benefit of all whom it might concern. Naturally, this behaviour on his part strikes the "Electrician" as very unkind to the system to which Mr. Fyfe had already professed his dislike. It admits that "the regrettable accidents which have occurred in this country in connection with the employment of high-pressure alternate currents afford a ready means to unduly prejudice the public against their use;" and it observes, in an injured way, that "it has been reserved to Mr. Fyfe to take advantage of this opportunity."

Why, holding the views he does, and avows, Mr. Fyfe should not take the opportunity of drawing attention to the blood-tax which has to be paid for the advantages, whatever they may be, of high-pressure alternating currents, impartial observers may be forgiven for not seeing. It is asserted by the "Electrician" that his communication is "an extremely inconsequent production." This point is supported as follows: It is "as if one should say: 'Being convinced of the superior reposefulness and breeziness of travelling by goods' trains, I felt impelled to write to the Board of Trade to inquire how many people have been killed by accidents to those horridly dangerous express trains.'" It is our respected contemporary that is here guilty of inconsequence, and not Mr. Fyfe. For his inquiry referred wholly to casualties to the employees of electric lighting undertakings; and if a similar inquiry were to be addressed to the railway companies, it would probably bring out the fact that goods traffic kills many more railway men than express trains. Besides, one fails to perceive the existence of any analogy between continuous electrical current generation and goods trains, or between high-pressure alternating currents and express passenger traffic. The two branches of railway working are wholly different in every respect; whereas the two systems of electricity generation subserve the same end, which is the distribution to the consumer of energy that answers the identical purpose of lighting up incandescent lamps.

There may be, and doubtless are, reasons why in certain circumstances one system of electricity generation and distribution should be preferred to the other; but it is futile to attempt to disguise the subsidiary features and concomitants of either. The high-pressure alternating system has its own little peculiarities, which the Board of Trade are not singular in keeping account of. A central station, working at high pressure on this system, is a distinctly lively place; and those engineers who have much experience in this line, have little to learn concerning the mishaps and troubles that attend the driving of boilers, engines, and dynamos "for all they are worth." On the other hand, a continuous current station may be a safer place to be in, night after night; but the current as sent out is quite capable of creating a little diversion in the ordinary course of wayfaring life. The St. Pancras Vestry have just had an unpleasant reminder of this possibility of the ordinarily harmless low-pressure continuous current, in the shape of an action brought by a poor woman for compensation for injuries caused by a culvert explosion in Gee Street, in February of last year. The plaintiff alleged that in this particular culvert, the property and under the control of the Vestry, there was on a certain day an accumulation of coal gas and air; and precisely at the psychological moment when she happened to be passing by a manhole in the culvert, an electric spark ignited the coal gas, and there was an explosion, in consequence of which she suffered shock to the system and acute inflammation of the optic nerve of the right eye. It was a curious result; but in the event, the plaintiff succeeded in convincing the jury that it was the current that did it. The defendants pleaded that they had not been guilty of negligence in the control of their culvert, which they had constructed with reasonable care, and in accordance with the best state of knowledge of such matters at the period. It was argued on their behalf that, as the Vestry had been empowered to lay down wires charged with electricity, if they did the work reasonably well they were not liable. Unhappily for them, there was no getting over the explicit responsibility of electricity supply undertakers in respect of the committal of nuisance; and, besides, there was that remarkable formation of crude sodium as a deposit in the conduit, which could not be accounted for on any other hypothesis than that somebody had not taken sufficient precautions against the current going wrong. So the plaintiff obtained a verdict, with £150 damages. The penalty seems high, having regard to the nature of the evidence of injury; but it is pretty well understood by this time that juries will always find for such plaintiffs, if there is a tittle of reason to warrant their so doing. It was the same in the case of the Southwark Bridge explosion, when the South Metropolitan Gas Company had to pay smartly for little more than frightening a man who happened to be passing over the bridge at the time. If local authorities will put themselves in the place of commercial undertakers of electric lighting, or any other public service, they will be made to pay up as extravagantly as public companies for any alleged damage to the person or to property that may be done in the course of their operations. The truth may not be palatable to the "Progressive" mind; but there is little sign of Progressivism in the Vestry's defence.

The Incandescent Gas-Light Patent Cases.—By an inadvertence, which would have been corrected mentally by readers of our report of the evidence in these cases, we printed, in last week's editorial comment upon Mr. Justice Wills's judgment, the name of Buchanan for Ballantyne, as that of the analytical chemist who received an encomium from the Judge. There was nobody of the name of Buchanan engaged in these cases. Mr. Horatio Ballantyne is chief assistant of Professor Tatlock, of Glasgow; and it was the absence, in South Africa, of Professor Tatlock, who was to have given evidence, that afforded Mr. Ballantyne the opportunity of gaining distinction which he turned to such good account.

INVENTION AND PROGRESS.

A TOPIC upon which we have often descanted in these columns, was recently discussed editorially in "Engineering," under the title "The March of Invention." Our contemporary began by remarking that the man who professes to be able to read the future is always sure of an audience; and proof of the truth of this observation lies on all hands. Some people still consult astrologers and encourage the performances of "spirit mediums;" but these form only a small contingent of the host of those who willingly lend an ear to the lecturing electricians and mechanicians who so frequently discourse concerning the "good time coming," when the highly municipalized townsman will only have to press a button, and electricity, or something else, is to do all the rest—whatever it may be. Visions of a splendid future, as our contemporary justly observes, if well drawn, are sure of a welcome. "Time and again an author has leapt into popularity on the strength of a single volume depicting humanity bathed in happiness, in (say) the year 2000. Generally the beatitude is of a somewhat heathen kind, dealing more with material than intellectual and spiritual delights. Its causes do not lie in the regeneration of character, but in the amplification of the power of machinery;" and it may be regarded as greatly to the credit of a journal devoted to the advancement of mechanical science, that this view is treated so contemptuously. Our contemporary points out that whenever the popular prophets make the millennium "depend on electricity, or odic force, or some occult form of energy, the imagination is stimulated, and the most marvellous statements are accepted as if they were descriptions of phenomena." Yet inventions which affect humanity are as truly subject to growth as a human being or a society. This is why the wiser contemplators of the future prefer to look at its possibilities in the light of the past. In his presidential addressto the Institution of Civil Engineers, Sir Benjamin Baker quoted the phrase, "the future does not come towards us, but streams from behind over our heads." So nothing ever happens, as our contemporary remarks, but what has happened before in a more or less complete fashion. "The difficulty is to know which of the innumerable facts set forth in the record will dominate the age before us." This is, indeed, the *crux* of the problem that the desire for progression sets before those who feel it most. It is no mere accident that every successful invention is immediately beset with rivals who are invariably able to trace the whole movement in which they seek to take part to some overlooked "anticipation." This is, in point of fact, an inevitable part of the trial to which every new thing in science and the arts must be subjected. We are all ready to assent in a general way to the truth of the saying which assures us that "there is nothing new under the sun;" but it is none the less a shock to learn how well the aphorism is supported by concrete examples whenever the presumption of novelty comes to be raised in regard to a particular invention.

Substantial service to the community is rendered by those critics of mechanical science who point out the slenderness of the reasons that underlie those prophecies which assume that in the future there will be an immense change in the knowledge and practice of mechanical science. It is true of the present, as "Engineering" says, that in this age the entire system of civilization rests on engineering science, and without it must drop into appalling ruin. "By machinery we live, and move, and have our being; some of us are brought into the world by the aid of mechanical devices; while others are hurried out of it by the same means. From the commencement to the end of our lives, we depend on the work of the mechanic; and, therefore, it is of the greatest importance to us to be able to form some reliable conception as to what he will do in the future." Here is where the opportunity of the electrical and mechanical vaticinator crops up; and, consequently, it is at the same juncture that the competent observer has to turn on his stream of cold criticism.

It is equally possible to prophecy evil as well as good of the world's future. But sombre forecasts, such as that of the New Zealander sitting on the ruins of London Bridge, are out of fashion. And rightly so; for they entail the assumptions that engineering science will perish, and that the moral qualities of the dominant races of the world will also disappear. On the other hand, those predictions which paint mankind as rivalling the powers and sharing the delights of the gods, assume a mastery over the powers of Nature which there is at present no indication that men ever did or ever will possess. The persons who make these predictions are not engineers, although some of them may so describe themselves.

As an able American writer has shown, these rosy prophecies have a distinctly injurious effect upon the fortunes of engineering in the present, with which the only true hope of mechanical improvement for the future is inseparably united. While people's minds are being filled with dreams of a future of flying machines, light without heat, submarine navigation, seeing at any distance, and talking over continents by means of electricity without wires, and all the rest of it, there is a real risk of their regarding our existing transportation, lighting, and telegraph systems with distrust, as having something of the provisional in their nature. What is the good, such people may be disposed to ask themselves, of putting money into railways, steamship companies, gas undertakings, submarine telegraphs, or even electricity supply undertakings, when Professor Farsight and Dr. Cloudsailer, F.R.S., assure us that all these makeshift arrangements are doomed to disappear in a few years' time—especially as the coming New Democracy will not respect the statutory guarantees under which we are asked to sink our savings in these perishable ventures?

These fascinating prophets of the new order of things to come have, of course, their points of departure in the present, and especially in the border-land, of unknown extent and little-understood possibilities, which surrounds all the physical sciences. Nobody knows, for instance, what electricity is; and this gives the professional seer a fine scope for prognosticating all sorts of possibilities respecting its improved generation and utilization. But then, we are equally ignorant as to the nature of gravity, of heat, light, force, energy, chemical affinity, molecular action, or the link between consciousness and vital organization. It would be useless for our latter-day prophets to tell the average man that since nobody knows what life is, whether of beings animate or things inanimate, we must be prepared for the advent in the near or distant future of a new race of humanity and new types of the animate creation. Nobody would pay the slightest heed to such a phantasy; yet it would be at least as reasonable an anticipation as any prospect of being able to get electricity for nothing, as soon as we or our posterity shall succeed in finding out what it is.

It is the office of the competent critic in both physical and mechanical science to make it clear to the understanding of the average man, that the results of experiment in the adaptation of natural forces, as we know them, to the use and convenience of man, are as likely to be permanent as law or any other human institution. It does not in the least matter that we do not know what heat is, or gravity, so long as we can use their effects for our own purposes; and it is the qualities after all, more than the essential nature of things, which concern us and subserve our purposes. Besides, that unknown border-land of physics to which reference has already been made, is not the region wherein would-be upsetters of established systems can hopefully seek means to this end. The possible range of improvement in most of the mechanical appliances used by civilized man is better marked out within the cognizance of experts than the general public suspect. Surprises of this kind are doubtless in store, even for experts; but any novelties that crop up will take their place alongside of, and not in substitution for, appliances already known.

Moreover, the public do not realize the slowness with which all considerable mechanical inventions come to their full growth and perfection. "No invention greatly influencing the life of a nation even sprang into full existence all at once. . . . It is entirely beyond experience that a man should walk out of his laboratory bearing in his hands a machine capable of instantly revolutionizing the present order of things. . . . One generation sows and another reaps; and it is well that it is so, else we should always be in a condition of change and turmoil." No more remarkable innovation upon established systems was ever seen than the incandescent electric lamp, which sprang in almost perfect form from the hands of Edison and Swan, and was popularly credited with the power to supersede gas lighting altogether. It was not, however, quite perfect as a lighting appliance; it is not perfect even yet. And to-day the prospects of the gas industry are brighter than ever.

An invariable feature of modern physical and mechanical prophecy is that it never by any chance succeeds in foretelling what is actually going to be done. It tells us where imperfections exist in systems actually in operation, and declares that the progress of the future will consist in the removal of these shortcomings. Unhappily, this is never done in the fashion predicted. That there should be an express demand for this, that, or the other mechanical improvement, plain enough for the popular lecturer to perceive and dilate upon, is pretty good evidence that such an improvement is not to be hoped for. Invention refuses to be led in any such obvious guidance. True invention may be—almost necessarily is—anticipated in some degree; but it is always unexpected. Take the striking example of the Röntgen rays, which are actually occupying attention in all the physical and electrical laboratories throughout the world. Did any prophet, writing or speaking six months ago, predict the possibility of viewing a man's skeleton through his clothes and fleshly integument, and "spotting" a buried bullet among them? Not one; yet the thing is now a commonplace of surgical diagnosis. Of course, Röntgen was anticipated. His discovery was led up to quite naturally by many previous observations and experiments. Yet it was his fate to make the one step forward which was to immortalize himself, and give the world something fresh to think and work about.

The conclusion of the whole matter is that there need be no hesitation in supporting and developing known systems of performing mechanical services to the community, on the ground of their being liable to be superseded by something so infinitely better as to render them practically valueless. Even if the something infinitely better were to appear, it would take a long time to materialize, and still longer to impose itself upon the community. The greater the system involved, the slower it will be affected by the march of improvement. People constantly see small inventions coming to the front, and other familiar devices dropping out of use; and the interests represented by some of these changing appurtenances of civilization are of considerable

magnitude. Thus, the match industry arises, and the "cycle" appears. The gas-engine is rendered a practical motor; and the typewriter invades every commercial office, so that we become strangers to the "hands" of our most familiar business friends. Still the railway and the steamship, the telegraph wire, and the gas-works, remain, and grow even greater and more useful to the community; for there is a fundamental difference, more easily felt than expressed, between these industries and the trades that fill the shops of one decade with goods unknown to that which preceded it.

PERSONAL.

Mr. D. P. Osborne has joined the directorate of the Arundel Gas Company, in place of the late Mr. J. Sprinks.

Mr. James Swinburne is now delivering at the Society of Arts a course of Cantor Lectures on "Applied Electro-Chemistry." The first lecture was given last night.

Mr. R. J. Jones, of Aberystwith, who is a member of the Corporation as well as the Manager of the gas-works, has been made a Justice of the Peace for the borough.

Mr. G. W. Lund, the Borough and Water Engineer for Blackburn, has resigned his position, on being appointed one of the Surveyors to the Metropolitan Asylums Board.

Mr. E. Parker, son of the late Manager of the Oakengates and St. George's Gas and Water Company, Limited, has been selected, out of about fifty applicants, to succeed his father.

Dr. H. Wedding, of Berlin, is to be the recipient of the Bessemer Gold Medal which is annually awarded by the Iron and Steel Institute in recognition of meritorious services in advancing the science or practice of the metallurgy of iron and steel.

Mr. W. W. Hulse has resigned his position as Secretary and Manager of the Longton Corporation Gas-Works. The matter came before the General Purposes Committee last Wednesday, when a resolution was passed accepting Mr. Hulse's resignation with regret.

Mr. J. H. Rider, the newly-appointed Electrical Engineer to the Plymouth Corporation, has been presented with a gold watch and chain at Bolton, where he occupied the position of Electrical Engineer to the Corporation. The gifts were subscribed for by corporate officials and members of the Town Council.

Mr. J. W. Slack, of Tunbridge Wells, has been appointed by Messrs. Richmond and Co., Limited, to represent them in the South of England and the Channel Islands. Mr. Slack was for eighteen years with the Ashton Gas Company; and in 1892 he went to Tunbridge Wells, where he introduced the prepayment system, which has proved so successful in the town.

Mr. E. A. Allan, who recently retired from the post of Manager of the Walker and Wallsend Union Gas Company, has been appointed a Justice of the Peace for the County of Northumberland. Mr. Allan was congratulated on his appointment by the President of the North of England Gas Managers' Association at their meeting in Newcastle last Saturday.

OBITUARY.

Alderman Highett, M.D., who for a great many years had been a member of the directorate of the Bristol Gas Company, died on Monday last week, at the advanced age of 84 years.

Mr. Edwin Cook, the Chairman of the Brierley Hill Gas Company, died recently at his residence in that town. His father was one of the founders of the Company; and, after his death, Mr. Edwin Cook became a Director, and subsequently Chairman. He was on the Board for 41 years; and for some 36 years he held the position he occupied at his death.

Mr. J. Wavell Littlefield, the Chairman of the Ventnor Gas and Water Company, died on the 19th inst. He had not been in good health since last October; and two surgical operations which he had to undergo overtaxed his strength. Deceased acquired a chemist's business at Ventnor in 1854, and carried it on (latterly with the assistance of his sons) up to his death. He was a member of the old Town Commissioners, and also of the Local Board, of which he was Chairman from July, 1876, to April, 1877. He was on the Board till April, 1877, when an agitation sprang up in regard to the Gas and Water Company; and he then lost his seat, which he never sought to recover. He was for many years a Director of the Company, and was elected Chairman on the death of Mr. G. Garnett.

Paris Gas Company.—The receipts of this Company for the year ending Dec. 31 last amounted to 97,870,594 frs. (£3,914,824), of which 78,757,716 frs. (£3,150,309) came from the sale of gas. The latter item is an advance to the extent of 1,659,166 frs. on the corresponding one for the year 1894. The expenditure was 69,105,682 frs. (£2,764,227), as compared with 69,491,225 frs. (£2,779,649) in the previous year. The amount available for distribution among the shareholders allowed of the payment of a dividend of 64 frs. 50 c. per share (£10), and left a balance of 174,321 frs. The dividend is 2 frs. per share higher than last year; and it accords with the anticipations of the Directors.

NOTES.

Dr. Stevenson Macadam on Destructors and Dust.

Dr. Stevenson Macadam has read a paper before the Manchester Section of the Society of Chemical Industry, on destructors for consuming town refuse, in which most known forms of the apparatus were criticized, and a description was given of a twin-cell arrangement which the author believed would prove superior to all. Dr. Macadam's idea is that, in such a duplex destructor, one of the two cells would always be not only burning off its own material, but also be acting as a live cremator for the thorough heating and combustion of the noxious vapours and gases from its neighbour. This good office it would fulfil by merely reversing the flue currents, by alternately opening one damper and closing another, and at no cost for coke or any other sort of fuel, or even labour. In connection with this plan, Dr. Macadam submitted a number of analyses of samples of dust collected from roads, railway carriages, and other places on different days of last year, with special reference to dust originating from the working of refuse destructors. The last-named variety of dust is characterized by its peculiar, "singed-like, fœtid odour," which is also reputed to cling to the person and clothes after each inspection of the apparatus. Ordinary road dust, when diffused through the air, does not evolve any particular odour; and the same negative result is given when the road-dust is heated with water. If placed on platinum and heated over a lamp, the road-dust merely evolves a slight corky straw odour, and has no singed, fœtid smell. Railway dust, as taken from the permanent way and from passenger platforms, when diffused through the atmosphere yields no particular smell; but when heated on platinum foil, it evolves a burnt coal odour, without any singed, fœtid smell.

The Flash-Point of Burning Oils.

At a recent meeting of the Scottish Section of the Society of Chemical Industry, Mr. D. R. Steuart read a paper on the standard flash-point for mineral lighting oils, in which the results of many experiments with oils and lamps were given. The general purpose of the author (whose paper was briefly noticed in the "Journal" for the 10th ult.), was to compare high-flashing with low-flashing lamp oils in regard to the danger of upsetting or exploding the lamps in which they were respectively burnt. His conclusion is broadly that no lamp oil with a close flash point of under 100° Fahr. is safe. He thinks very little of the supposed safety lamps recommended by Mr. Spencer, of the London County Council, observing that experiments with new lamps, in good condition, are worse than useless as indications of the security of the apparatus. Upon the question of whether oils of low or high flash-point develop most heat in burning, Mr. Steuart is inclined to think that the former are the hottest burning. But, even so, he holds that the latter are the safer. The heat of burning developed in lamps is stated to be dependent on many little obscure circumstances; and Mr. Steuart believes, but is not quite sure, that the oil lamps used in Scotland differ somewhat from those used in England for American oil. He declares that there is no room for two opinions as to the fact that oil flashing at from 73° to 83° Fahr. gives off explosive vapours at ordinary summer temperatures, and ordinary temperatures of lamps even in winter, and is therefore very dangerous. "Probably," he says, "every evening in London the dangerous explosive mixture is present in about a million lamps. But only in a few cases does the light get at it; and in only a few of these again is there any damage done." With a standard of 100° Fahr., he admits, no doubt the explosive mixture would occasionally be present, but in very few cases; and even of these the proportion that could get the light applied would be a very small percentage. It is asserted that the low-flash American oils at present in use in England are so made by reason of their containing naphtha, which is alleged to be put into the oil as an adulteration, although stated to be generally dearer than burning oil.

A New Shape of Brick.

Discussing in the "Builder" the results of the tests made by the Institute of Architects on a series of 18-inch brickwork piers, Mr. H. H. Statham suggests that these piers were not built in the strongest possible way. This was not the object of the tests, which were designed, not to ascertain how strongly brickwork piers could be built, but rather how strong they are when built in the usual way. The piers tested were built in "old English bond," of headers and stretchers alternately, which required a couple of closers in each line, to break joint. These closers were the principal source of weakness in the piers. The question is of considerable importance in relation to engineering construction, in which 18-inch piers of brickwork, for supporting cast-iron or steel columns, are commonly met with. It is desirable to make these piers as strong as possible; and Mr. Statham suggests that, by the introduction of a new brick, measuring the ordinary length, but brick-and-a-half wide, the use of queen-closers might be obviated. It is stated that one maker had been making bricks of this shape; but that he abandoned the make, because there was not sufficient demand for it. This must have been, Mr. Statham considers, because architects and builders did not know what was good for them. Mr. Statham suggests that in the building of 18-inch piers with the help of the new bricks of 7½ inches

width, the latter should be used at the corners—the common brick forming the centre. He dismisses the idea of making closers in common brick as commercially impracticable; but it may be remarked that in fire-brick work, specially made closers are always used when a firm job is desired. It is a question, as Mr. Statham remarks, whether the idea that common bricks can only be made of one shape is not a mere trade superstition that ought to be exploded now that brick piers are required to carry such heavy loads.

Gas-Retort Carbon Anodes.

In the course of an article in the "Engineer," describing the works of the Electro-Chemical Company at St. Helens, in which caustic soda and chlorine gas are produced from common salt by the electrical process of Holland and Richardson, mention is made of the new employment and market created for gas-retort carbon by this process. The difficulties of the early experimental plant were many; one of the greatest being the rapid wasting away of the charcoal points used as anodes, which threatened to render nugatory all prospects of commercial success for the process. At length the alternative of using pieces of gas-retort carbon for the purpose was hit upon; and this material proved to be both durable and efficient. The Electro-Chemical Company have bought many tons of retort carbon from different parts of the country. Our contemporary saw the stock of this material upon the works, and was "struck by the difference in the grain and weight between such of this as had been obtained from London Gas-Works, and that purchased in districts beyond that area. Anodes constructed with the London-produced carbon are found to have a materially longer life than those made of the country product." In the preparation of these anodes, all that is done is to break the carbon into rough pieces about the size of the hand; a lug being then sawn upon every piece. Seven or eight such pieces are arranged in a frame, which holds them inverted in the brine. In the process, chlorine appears at these anodes as soon as the proper current is sent through them; and it is exhausted away through lead tube, and eventually taken up by lime.

Incandescent Gas Lighting in Munich.—The Municipality of Munich have laid out 20,000 marks in carrying out an installation of Welsbach gas-lights in the public lamps in the streets lighted by electricity, with the view of getting rid of the disagreeable effect resulting from the contrast with the old lighting.

Preventing the Leakage of Electric Current.—The Council of the Society of Arts offer the Fothergill Prize of £25 and a silver medal for a paper on "The Best Means of Effectually Preventing the Leakage of Current to Earth in Electrical Installations from Generating Heat and Setting Buildings on Fire." Papers submitted for the prize must be sent to the Secretary on or before Oct. 1 next.

Metered and Schedule Water-Rates in New Bedford (Mass.)—Mr. R. C. P. Coggeshall, the Superintendent of the New Bedford (Mass.) Water-Works, gives in his last annual report some interesting comparisons of metered and schedule water-rates. There were 21 meters placed; and on a majority of these the schedule rates were only half the metered rate; while in four cases they were only one-third or less.

The Forthcoming Meeting of the North British Association.—The Secretary of the Association (Mr. R. S. Carlow, of Arbroath) has issued his usual preliminary circular in reference to the forthcoming annual meeting, which will be held on Thursday, July 23, and the following day, and for which the Committee are now making preparations. In inviting the assistance of the members in rendering the proceedings as instructive as possible by the contribution of papers on some useful topics, Mr. Carlow points to the fact that the present period in the history of gas lighting is characterized by great activity—important changes taking place not only for improving the lighting properties of coal gas, but for extending its uses in various ways. Appended to the circular is a list of suggested subjects, any one of which could be dealt with to the advantage of the general body of members. As Edinburgh will be the meeting-place, the gathering this year should be both pleasant and profitable.

Income-Tax on Colonial Property.—The Council of the Royal Colonial Institute have addressed to the Chancellor of the Exchequer a memorial relating to the payment of income-tax in the United Kingdom on income earned and taxed as such in other parts of the British Empire. The memorial points out that it is only quite recently that taxation of income has in any general sense become part of the statute law of the large self-governing colonies, and notably the Australasian colonies. The grievance is that British subjects resident in any of the Australasian colonies are not required to pay a double tax in respect of any income derived from the United Kingdom, while those resident in the United Kingdom are called upon to do so in respect of any income derived from any of the colonies. The memorialists bring forward a variety of arguments to induce the Government to remedy this grievance; notably that in the Finance Act of 1894 provision was made to avoid subjecting the same property to double death duties—a principle which it is contended is entirely applicable to the question of income-tax. The Secretary of the Royal Colonial Institute has received a formal acknowledgment of the memorial, and an assurance that the subject shall have consideration.

TECHNICAL RECORD.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

Half-Yearly Meeting at Newcastle.

The North of England Gas Managers' Association held their Thirty-Eighth Half-Yearly Meeting in the office of the Newcastle and Gateshead Gas Company last Saturday, under the Presidency of Mr. HERBERT LEES, of Hexham. There was a large attendance.

The PRESIDENT said it was not his intention, neither did he think it in the interest of the meeting, to take up much of their time. They had a long programme, and one which would require constant attention; and he hoped it was a programme which would be beneficial to them. The papers that would be read were such as would be interesting to every gas-works manager or secretary; so let them make the very most of the time. But there was one matter he thought he ought to refer to. Since the last meeting, one of their members had passed away. He referred to Mr. Edington, of Blyth. Those who were acquainted with Mr. Edington knew that he was very deeply interested in the Association; and he was sure he expressed the feelings of every member when he said how deeply they regretted his loss.

THE ACCOUNTS OF THE ASSOCIATION.

The PRESIDENT moved the adoption of the annual accounts. These, he said, showed that the year began with a balance of £27 5s., and ended with a balance of £35 9s. 8d.

Mr. J. H. PENNEY (South Shields) seconded, and the accounts were adopted.

NEW MEMBERS.

On the motion of Mr. T. BOWER (West Hartlepool), the following were elected members of the Association: Mr. W. M. Ruxton, Manager, Gas-Works, Berwick; Mr. R. H. Townsley, General Manager of the Corporation Gas Department, Leeds; and Mr. C. H. Armstrong, Secretary of the Walker and Wallsend Union Gas Company.

Mr. J. H. PENNEY (South Shields) read the first paper, which was entitled—

HOW TO MINIMIZE BAD DEBTS.

When invited to contribute a paper to this meeting, it occurred to me that a few thoughts and suggestions upon "Bad Debts" might not be out of place, if only to evoke a discussion, and thus afford an opportunity for the mutual exchange of opinion and experience on this subject, seeing that most of us have to contend, more or less, with this "unstable element."

Whatever the sale of gas per ton of coal may be, it clearly behoves the rental department to see that the maximum amount is realized. If the sale per ton be small, there is the greater necessity to exercise vigilance in this respect; if large, there is no earthly reason why a shilling more than is necessary should be lost. Hence it becomes a question of how to accomplish this object, or, in other words, "how to minimize bad debts." Undoubtedly, the best way to attain so desirable an end is to concentrate our attention on the gas accounts, individually and collectively, from their inception to their close; and specially on the efficient collection thereof in the interim, by constant supervision. I therefore have the pleasure to submit, for the favour of your consideration, the following suggestions on these points.

In the first place, while we seek, by employing such popular mediums as gas exhibitions, &c., to "gather into the fold" as many gas consumers as possible, we must, as a preliminary safeguard, put all "applications for gas" through the ordeal of inspection, in order to discriminate between the non-paying consumers and the *bonâ-fide* ones before accepting them. It cannot be denied that among the many applicants for a supply of gas, there are some who cannot pay, and others who never intend to do so. What are we to do with these? We need not "send them empty away;" on the contrary, we can adopt a little diplomacy by suggesting the following alternatives: (1) A cash deposit. (2) A guarantee, to be signed by two respectable householders. (3) A prepayment meter (if we happen to have adopted such a modern convenience).

We can, of course, take the sting out of No. 1 alternative (the cash deposit) by paying interest for the use of the same at, say, 4 per cent.—a good and safe investment by the way. If one of these alternatives be accepted, we convert a "doubtful" consumer, into a *bonâ-fide* one; thus securing ourselves against a "bad debt" at the outset. Applications by letter or by deputy should be discountenanced, and personal application insisted upon as far as practicable, for obvious reason.

The next step is to have the whole of the gas bills written up, as far as possible, in advance, by inserting the number of the account, the name and address of the consumer, the last index, and the arrears (if any); so that ultimately there will be nothing to do but fill in the final index, and complete the accounts in readiness for the collectors. The gas accounts may, for convenience, be made up into books of (say) 250 each. It is better to have gas accounts printed in the combined form of an invoice and receipt, with a lightly-perforated counterfoil (accounts too heavily perforated often fall out and get lost.) It is a waste of

time to use two forms—*i.e.*, a separate invoice and a separate receipt. Loose or unbound ones I regard as an abomination. As a case in point, I well remember an aged collector, who used this kind of bill, reporting at the close of one windy day that his supply of accounts had been "scattered to the four winds of heaven." This inconvenient accident would have been avoided had the accounts been bound up in book form as here recommended. To facilitate collection, the accounts should be arranged in geographical order, so far as the streets are concerned; and the numbers of the houses should also follow in their proper sequence.

An early inspection of the meter indices is most important. This rule should at all times be carefully observed. It is absolutely necessary that the meter readings should be completed and handed to the rental clerks not later than the quarter day; and it is all the better if this can be accomplished a few days earlier, but certainly not a day later under any circumstance. Late inspections mean delay in the collection; and consequently conduce to the making of "bad debts." It is also important that uniformity be observed in the dates when the quarterly inspections begin and end, because any irregularity in that respect throws the accounts out of truth when compared with a previous corresponding quarter, and renders it difficult to explain to the consumer; thus giving rise to misunderstandings, delay in the settlement of the accounts, and in many such cases terminating in "bad debts."

The gas accounts should be placed in the hands of the collectors as speedily as possible, in order that they may begin the collection punctually on the quarter day. With that view, the rental clerks should daily receive the indices from the inspectors, which will enable them to complete the accounts, keep pace with the inspection, and be in a position to supply the collectors with such accounts as fast as they need them. All indices not seen by the inspectors on their first round should be taken up each day as they pass through the districts, so that there may be as few accounts as possible left in abeyance from quarter to quarter; otherwise this will, in a measure, form an inlet for "bad debts." The collectors will pay in their receipts daily, having first entered them in the office cash-book; and the rental clerks should without delay post the same into the ledgers.

The collectors, having gone through their entire districts, will next attend at the office to receive payment from the consumers who failed to pay them when on their daily rounds. If a discount is allowed for payment within a fixed period, the collectors will continue in attendance till the last day for discount is passed, they should then start on their second round, with a view of getting in as many unpaid accounts as possible; and repeat the process, at intervals, until they have brought outstanding accounts down to a minimum.

The next important step is for the collectors to prepare complete lists of all unpaid accounts in their respective districts of (say) two quarters standing, or one quarter where the account is a heavy one and they anticipate non-payment; submitting such lists to the Board of Directors or the Gas Committee, as the case may be, and obtain permission to invoke the majesty of the Law—*i.e.*, to summon all consumers in arrear before the Magistrates. The collectors will next issue an intimation, in the form of a notice, to such consumers, stating that they will be summoned if payment be not made on or before a given date. This will, as a rule, bring in the bulk of the arrears. The collectors will, at the expiration of such notice, attend the Court, and take out summonses for the accounts still unpaid. By the time the summonses are returnable, it will generally be found that there are but few consumers to appear against—probably persons who, from various causes, are utterly unable to pay. These will, in due course, have "orders for payment" served upon them by the Court. In the event of failure to pay after that, distress warrants follow, and the supply of gas is cut off. This plan of presenting a quarterly list of arrears is a most valuable one, as it puts the collectors on their mettle to keep arrears down to the minimum. The subsequent processes of summoning and cutting off, square matters up to date, and act as a powerful bar against the formation of "bad debts." All irrecoverable accounts are next written off; and thus the past quarter is entirely disposed of; leaving a clean sheet for the commencement of a new one.

The foregoing suggestions may be briefly summarized as follows:—

(*a*) Careful scrutiny of all "applications for gas" before acceptance.
(*b*) Partial preparation of gas accounts in advance.
(*c*) Early, uniform, and punctual inspection of meter indices.
(*d*) Early, punctual, and rapid collection of accounts.
(*e*) Quarterly list of all arrears to be prepared and submitted to the Board or Committee.
(*f*) Issue of notices to summon.
(*g*) Issue of summonses.
(*h*) Issue of distress warrants and cutting off supply, in the event of summonses not proving effectual.

Some of these measures will perhaps be considered too heroic. However, they must be regarded as "necessary evils." As a rule, common-sense consumers do not complain about them—in fact, some look upon the summons in the light of a convenience, inasmuch as they gain extended time for payment at a nominal expense. I may here add that we are ever open to extend the hand of mercy in exceptional cases, where it would be deemed cruel and inhuman to put the last-mentioned regulation (*h*) into force.

These are pretty much the lines on which we have worked at South Shields for many years, with satisfactory results. Our bad debts on the gas-rental have, during the past ten years, been as high as 0·42 and as low as 0·22 per cent. The average for that period comes out at 0·33 per cent. I have not compared notes with other companies upon the question of percentage, because I consider it somewhat invidious to do so, inasmuch as the circumstances and conditions of different companies are so varied. For instance, one company may supply a district where the population is of a migratory character—"here to-day and gone to-morrow." On the other hand, another company may supply one where there is a more settled or stationary population—to be found in the same spot "year in and year out." Hence a percentage that might appear low in the former case would probably be deemed high in the latter. I do not wish to affirm that our percentage of loss by "bad debts" at South Shields is the lowest on record; on the contrary, I have seen one or two cases quoted at phenomenally low figures—almost infinitesimal, in fact. I must add, however, although I say it advisedly, that I am somewhat sceptical as to their *bona fides*. It may be that such apparently favourable results have been produced by a system of prepayment all round.

Let me here add a few words about the collector, who must necessarily play an important part in such a system of collection as I have attempted to sketch. In the first place, he should be a collector pure and simple; having no duties imposed upon him other than those relating to his special work. Every facility ought to be given to enable him to get through his work with despatch. He should be physically strong, and early trained to the work; endowed with tact and a good temper; and firm, but courteous, in his demeanour. In the course of his work, he will undoubtedly meet with many rebuffs; but, if experienced, he will treat these with philosophical calmness. All disputes relative to accounts should be referred to the office. The collector ought not to be delayed in his work by such matters, as time, in his case, essentially means money. Of course, there are exceptional cases for discrimination by an intelligent collector, where a passing explanation may suffice. But, beyond these, the office must deal with them. The collector, as a matter of course, should be under bond for a substantial sum; and, need I add, his remuneration ought to be in keeping with his arduous and responsible duties. My recollection carries me back to a collector of the old school—a genius in his way—whose invariable reply to the ladies, when appealed to by them for more time to pay, was, "Never mind hinny thou'll get thee bill paid some day." At that time (some thirty years ago) a summons would have undoubtedly been considered a crime, and cutting off the gas was an expedient seldom resorted to. The best-kept book was the "black book"—which was faithfully entered up; and save for that purpose it was rarely referred to. Arrears were allowed to accumulate rather alarmingly, when viewed in the light of present day systems; and, of course, "bad debts" formed a considerable item. Such a thing as ascertaining the percentage of loss was probably seldom thought of.

Pausing, for a moment, to contemplate by-gone methods, as compared with modern ones, even in matters of this kind, we may very properly exclaim, "Look here, upon this picture, and on this."

There are other phases of this question which I might perhaps have touched upon; but I forbear. I hope I have said sufficient to show that, by the adoption of a good system of collection, strictly supervised, faithfully carried out, and backed up by the services of an experienced and capable collector, "bad debts" can be materially controlled and minimized.

Discussion.

Mr. H. TOBEY (Malton) said the members had received from Mr. Penney an excellent and practical paper, giving very good hints and suggestions as to the way in which work might be conducted. He could not say whether, if they were to follow Mr. Penney's lead, they would be able to get their arrears down to so low a decimal point; but if they could, his would be an example which it would be well to follow. It was said: "Many men of many minds and many coins of many kinds;" and he believed this was true of gas management. In different places, the mode of working varied according to the method of book-keeping employed or the ideas of the secretary or manager. He noticed that Mr. Penney's method was to threaten consumers with a summons before the gas was cut off. This appeared to be a very excellent rule, because they might get a customer to pay, and they would not then lose a consumer, which they would almost certainly do in the opposite way. He had had some experience in taking gas consumers before a magistrate; and he had found that sometimes the magistrate required that the minute-book should be produced, to show the authority for prosecuting. He thought it was rather an awkward business to have to produce the minute-book on all occasions. They remembered the "Golden Rules" given to managers in Mr. Newbigging's book. He told them to keep up their heats, and to keep up the water-level in their wet meters; but, on the other hand, to keep down the pressure,

and to keep down the arrears. Perhaps they did not follow all these rules; but it was a very good rule to keep down the arrears, and to keep the accounts collected up as closely as possible.

Mr. W. HARDIE, sen. (Newcastle), asked Mr. Penney if his collectors did anything but collect. Did they make up their books?

Mr. PENNEY: No.

Mr. HARDIE said that in Newcastle the collectors not only collected, but they made out their books for collection; and he thought there was an advantage in their doing this, because, if a dispute arose, they were in a position to offer any explanation which might be necessary.

Mr. M. RICHLEY (Shotley Bridge) said that, if he understood the paper, arrears were not mentioned; and he would like Mr. Penney to state what was the percentage of arrears on the total sum collected in each quarter. It was important to understand this.

Mr. T. HAVELOCK (Newcastle) said that, although he was not directly connected with the gas industry of this country, he had no doubt Mr. Penney's paper would be of advantage to the members of the Association. He would just suggest that, by being too exacting, a gas company might lose customers; but in this remark he was, of course, speaking as one of the "glorious British public," and not as a gas manager. Mr. Penney showed that they had minimized their debts to less than 2½ per cent. He (Mr. Havelock) was not going to recommend any special idea; but he would say this—that if gas companies were in the position of being able to distribute dividends of 10 to 15 per cent., would it not pay them to popularize the use of gas at some sacrifice? If they wished the gas industry to prosper, and if they wished to fight the battle with the electric light, was it not needful to give encouragement to consumers of gas, to householders in all the by-streets even, if it meant only the risk of losing 1 or 2 per cent.? He did not say they could compel people to use gas, or that they should incur a distinct loss; but he did say that a judicious handling of this subject might be of distinct advantage to gas companies. He took it that gas companies existed, not for philanthropic purposes, but for profit; and if this were so, it would be worth their while "throwing a sprat to catch a herring."

The PRESIDENT thought it was good to have the opinion of a gas consumer, which they had got from Mr. Havelock. If they could occasionally have the opinion of the outside public, they might perhaps benefit by it. He did not know, however, that the conditions laid down in Mr. Penney's paper were so very exacting. A great deal would depend upon how they were carried out. The spirit in which they were administered was more than the actual rules that were followed. He had had some experience with the guarantee of two respectable householders; and his experience was that the guarantee was scarcely worth the paper it was written upon. This, perhaps, applied more to local authorities than to companies. They did not like to prosecute for another's gas bill one who might be as needy as the consumer himself. There was another method, to which perhaps reference might be made, and which tended very much to keep down bad debts, while at the same time it assisted in the collection. That was the system of giving discount for prompt payment. He worked by this system; and he knew they had it in Newcastle. He thought they had it at South Shields also. But be that as it might, a good many of them had knowledge of how the system worked. In their own case, they required no collector; their gas bills were sent out, and they were nearly all collected at the office. With the exception of those who did not intend to pay, they had no difficulty; and, of course, they knew how to deal with the defaulters. In some cases, they cut their gas off; and in others, they took the people into Court. Their arrears were exceptionally low. He thought they were lower than Mr. Penney's; but that might be owing to the character of the town. It was a town in which everybody knew everybody. They were not a migrating community, and might be different to deal with from the communities in a large town, where the population was changing frequently. Mr. Penney had largely dealt with a system which applied to a large undertaking. There were many of them there who were connected with smaller undertakings, to which the system might not apply; and he hoped they would get the benefit of the experience of some of them.

In the absence of any further remarks,

Mr. PENNEY, replying to the discussion, said that, with regard to Mr. Tobey's reference to the magistrates requiring the production of the minute-book, he thought they were too particular there. At South Shields, they never had any trouble in this way. They simply left it in the hands of the collector; but he supposed they should have to produce their minute-book if they were called upon by the justices. The magistrates could, if they liked, put them to a great deal of trouble. In the Jarrow district, he believed, they had had some difficulty. They had had to produce the Act of Parliament, and to carry the ledger to Court; but he thought it was only once or twice, and that it passed off with a repetition of the summonses from time to time. With regard to Mr. Newbigging's "Handbook," he might say that it really gave him the idea of the title of his paper—keeping down the arrears, which was one of the "Golden Rules" for gas managers. Mr. Hardie asked about the collectors making out their own books. They found at Shields that it was better to keep the collectors entirely apart from the book-keepers, for various reasons which, perhaps, he need not give. Mr. Richley asked what the arrears were at the end of each quarter. Of course, they were rapidly cut down by the processes they adopted. The notices, in the first instance brought in a great many of them. Then the summonses were issued; and when they got to the Court-day, they had very few to appear against—perhaps only two or three in each district.

Mr. RICHLEY: Is that after the expiry of the quarter?

Mr. PENNEY said that, after the expiration of the quarter, the total sum unpaid was very very small indeed. Their arrears when the last day for discount came, amounted to about £5000. Then this was cut down, as a rule, to about £150, which comprised bad debts. That was on about £47,000. Mr. Havelock spoke about being too exacting. Well, of course, it was all a matter of practice. The people in South Shields took the summonses and notices quietly. They rarely complained; so they must be accustomed to such proceedings. On the other hand, they gave every facility they could for the bringing in of consumers, and the pleasing of them. If there were any exceptional cases, they always dealt with them specially. They did really "throw a sprat to catch a mackerel." As to what the President said, of course the slight sketch he had given of their system of collection with a view to reduce bad debts, might not apply to smaller companies. In a place where everybody knew everybody, they did not need to proceed to these extremes—such as summonses. By-the-bye, he did really touch upon discounts in his paper. They did allow very high discounts, varying from 7½ to 20 per cent.; and he said this was a very powerful auxiliary for bringing in accounts. Indeed, he could not lay too much stress upon the fact that the discounts were a very powerful lever. Of course, they could not all see eye-to-eye in these matters. But the system he had attempted to describe to them, had really worked very favourably at South Shields; and they saw no occasion to change or modify it in any way. They had acted upon it for many years.

The PRESIDENT said that, without putting it to the vote, he knew that he expressed their feelings when he assured Mr. Penney that they were all much indebted to him for his paper.

Mr. H. TOBEY (Malton) read the following paper:—

ELUSIVE LEAKAGES FROM MAINS AND SERVICES.

It has probably fallen to the lot of most managers of gas-works to have been at some time much troubled and perplexed by leakages which have been difficult to trace to their source. Those who have had to track these "Will-o'th'-Wisps," know full well how elusive they are. In relating my experience, I do so, not that it is so striking in itself, but that it may serve as a starting point from which others may recount theirs.

During one hard winter, a gentleman occupying a semi-detached villa, came to me complaining that his house stunk fearfully of gas, and that the gas-fitter said it did not come from the fittings. Going to the house, I found the main tap turned off, and the house reeking with gas. There was not much in the cellar where the service-pipe and meter were; but it was most noticeable in the kitchen and scullery. Of course, immediate search was made; and the service-pipe, and the main immediately adjoining the premises, were examined by means of a probing-bar, but without any good result, as no leak could be found. The occupiers of the house were desperate at having to live with open windows during the inclement weather which prevailed at the time—there being some 8 inches of snow on the ground. Having failed to trace the escape to its source, it was determined as a means of giving temporary relief, to open the drain-pipe leading to the house—for the points at which the gas appeared to make its entry into the premises were the gullies on the scullery slopstone, and elsewhere. This had the desired effect, of freeing the house of gas; and subsequent searches revealed a fractured 3-inch main some 160 yards away. The gas escaping from it had found its way into an adjoining sewer-pipe and travelled up to the house. Although other houses were on the same sewer, they were unaffected, probably owing to their gullies being better trapped, or the sanitary arrangements of them being better arranged.

Some short time since, I was requested by a neighbouring gas company to investigate a nuisance said to arise from their working. The complaints were made by the occupier of a dwelling-house, the back garden of which abutted on the gas-works. At the time of my first visit, I could detect no smell, though I was assured by the occupier that there had been at times an offensive one. Complaints had, it appeared, been previously made. A month or two passed away before I heard anything more of the nuisance. I was then informed that there was considerable complaint of gas leaking into the same premises, and not those only, but also into the adjoining premises, consisting of three shops and houses, one of which was unoccupied. On this occasion, I found a very offensive smell in the occupied houses, but little or none in the empty house, which I may remark stood between the other houses. The smell, however, did not appear to me to be that of coal gas. It was more noisome—not of the same flavour, and seemed to have a phosphoric odour about it.

I applied Ansell's gas-leakage indicator to those parts where

the odour was strongest (which was the floor and skirting boards), but could get no movement of the pointer showing it was gas. I concluded it was not coal gas but sewer gas. To put it to the proof, I decided to try the drains with the smoke-test. The drain upon which I commenced operations was one passing along the outside of a sitting-room in which the offensive smell was very strong. It did not belong to that house, but to the unoccupied premises adjoining. The sitting-room had a boarded floor, and was the only room on the ground floor which was boarded. There was no cellar beneath it. We opened out to the drain where it crossed the pavement in the street; and having cut a hole in the sanitary pipe for the nozzle of the connecting-pipe, and inserted it, we lit the fire in the fumigator, and were about to commence blowing the smoke into the drain, when *presto!* a piece of the drain-pipe flew up into the air with a sharp report. This startled us, and caused me at once to alter my opinion as to the character of the gas.

The explosion was limited to that part of the drain-pipe which had been broken into, where the air had mingled with the gas which was inside. The gas had travelled up the flexible connecting-tube to the fire in the pan, and had there ignited. There was no doubt now it was coal gas. The smell as it oozed from the broken pipe was sufficient evidence of it. We made good the drain, and filled in; but we were still at a loss to know where the gas came from. The drain I concluded was connected to the main-sewer running along the street; and as this sewer had manholes at short distances away on both sides, I proceeded to try the sewer by means of the leakage indicator, and expected to discover gas in it. But, somewhat to my disappointment, I found none.

I then decided to have the main gas-pipe which was on the opposite side of the street to the complaining houses, bared and examined. I had previously tried it along its length with an iron probing-bar without any gas being found. When the main was stripped, no leakage of any account was apparent. The next thing was to examine the services. The foreman went over them with the probing-rod, and along the front of the houses, at short distances apart, and reported them to me as sound. The nuisance to the residents increased, and became so strong in the house first complained of, that the occupiers removed. The mains and services being apparently sound, there arose considerable difference of opinion as to the origin of the nuisance. The Inspector of Nuisances gave it as his opinion that the subsoil was saturated with gas-washings; and the Medical Officer of Health seemed to coincide with that view. Others thought there must be some old gas-main, or a drain-pipe which took a short cut underneath the premises from the gas-works to the street, and had not been properly stopped off. I examined the pump-wells at the backs of the houses, and found the water was not contaminated; neither did some subsoil water which collected in the cellar of the first house I inspected, smell or taste of gas. I could get no information of any drainage or main ever having crossed the premises.

Having found gas in the drains, I fell back on an examination of them, and decided to disconnect a drain which led out of the cellar I have mentioned, into the main sewer. On opening out the ground in the street for this purpose, there was disclosed an old sewer, about 3 feet to 4 feet from the surface, with the existence of which I had not previously been made acquainted. A new and larger sewer had been put in at a lower depth; and this old one had been left in, but cut off at both ends. Breaking into it, it was found two-thirds full of black soil; and from it issued what was undoubtedly coal gas. The leakage indicator was applied, and quickly run up to between 15 and 20 per cent. of gas. Having discovered so much, the next thing was to ascertain which end of the sewer the gas came from. It was, therefore, completely broken through, and each end clayed up, with a short piece of ¾ inch iron pipe passing through the clay, when the gas was found to be issuing from the south end. To further localize the point where the gas entered, it was again and again subdivided. By this means, it was found that the section where the gas entered was in close proximity to one of the service-pipes; and upon baring the pipe, it was discovered that a joint had been drawn apart and the pipe forced down at the place where it crossed the trench of the new sewer. The injury to the pipe may have been caused by the passage over it of a traction-engine or some heavily-loaded vehicle.

The escaping gas appears to have made its way downwards through the gravelly strata to the old sewer, and then along the sewer and drain-pipes, distributing itself through their open joints (for they were innocent of any jointing material—either mortar cement or clay). It would also travel through the strata to the dwelling-rooms, being drawn there by the suction of the fires. The asphalted paving, the metalling of the roadway, and the compact soil underneath it, would prevent it making its way upwards.

After this service-pipe had been made good, the nuisances gradually died away. One of the occupants did subsequently complain that the nuisance continued; but by observing the testing pointer of his meter and examining his fittings, it was found to arise from a leaky pendant. Had the overhauling of the service-pipes been more thoroughly done, the leakage would doubtless have been discovered earlier, and the nuisance abated sooner.

To search for escapes of gas in confined spaces with a light, is notoriously a foolish thing to do. Though a light may with safety be burning in a room where there is a strong smell of gas, an unwitting shifting of the light, either to the ceiling or the floor, may result in disaster. For there may be a dangerous mixture of gas and air underneath the floor boards—between them and the soil; while above the boards it is so diluted as to be harmless. In many instances, it is desirable some other test than a light should be used. There are not many available. The sense of smell is one of the readiest, and a fairly good one, but not absolutely reliable. It is a faculty much more strongly developed in some individuals than others, and is liable to temporary derangement and total absence. The devices which are constructed for detecting the presence of gas—which are based upon the law of diffusion—appear to give fair indication in some cases but not in all.

In the course of my investigations, I must say I was much surprised and disappointed at the conduct of the leakage indicator. With the rooms of houses more or less tainted with gas, it did not show its presence. I subsequently tried it with a leakage in the soil artificially made. An iron pipe about 26 inches long and 20 inches diameter was planted in the soil on end, with the top level with the ground; and gas was led into the bottom of it by means of ¼-inch iron pipe. The soil in and around it was trodden down. After gas had been passing in for fifteen hours, and 540 cubic feet had gone through, the leakage indicator did not indicate any percentage of gas, nor was there any smell of gas. After the lapse of twenty-four hours, when 800 cubic feet of gas had passed, the indicator showed from 2 to 3 per cent.; and there was a faint smell. At the end of the first fifteen hours, when a bar was forced down, and a channel made for the gas to flow freely up, the indicator answered to the gas at once—the pointer moving freely round. It would seem that, when gas percolates slowly through the soil, there is some active influence in it, which alters the character of the gas, and makes the indicator of no avail. In simple mixtures of gas and air, arising from leakage direct into the atmosphere, it answers well. These indicators are constructed to take advantage of the law of diffusion—namely, that the velocity of the diffusion of gases is inversely as the square roots of their densities. Thus four volumes of hydrogen will pass through a porous diaphragm in the same time as one volume of oxygen; oxygen being sixteen times as heavy as hydrogen.

In the early part of 1886, some interesting investigations upon the loss of smell by gas in passing through soil, made by the German Society of Gas Engineers, were published in the "JOURNAL OF GAS LIGHTING." The conclusions arrived at were that, though there might be an escape of coal gas through the soil which might not be odorous, it would not be considerable or dangerous; and that any escape before it became explosive or acutely harmful to individuals would be plainly apparent to persons whose olfactory organs were in a normal condition. Experiments were instituted to detect the presence of gas by other means than smell; and a chemical test was proposed, and apparently used with success—it being stated that the existence of gas could be recognized much sooner by it than by smell.

In adopting chemical means for proving the presence of gas, it was pointed out that there is no reaction known to exist exclusively in the case of coal gas. It is only the carbonic oxide it contains which produces characteristic phenomena. The quantity of carbonic oxide in gas is of first importance for its recognition by chemical means. It is a never failing ingredient of gases resulting from the dry distillation of carbonaceous substances—as wood, peat, coke, and coal. Coal gas contains quantities varying from 3 to 11 per cent. of it. Chloride of palladium is a chemical which has been found to give clear indications of the presence of carbonic oxide; it being capable of detecting the most minute quantities of it. In a solution of chloride of palladium, carbonic oxide separates metallic palladium, which can be recognized by the intense blackness, if carbonic oxide be in considerable quantity, and which discolours the liquid however small the amount of carbonic oxide may be. The paper goes on to say, since no gas but that used for lighting purposes has the same effect upon a solution of palladium (except hydrothionic acid, which is easily recognized), mistakes are impossible. The sense of smell may be defective, or the ordinary odour of gas may be modified or overpowered by the scent of other substances. The palladium test is free from those defects, which therefore gives it special value in discovering and distinguishing escapes of coal gas.

It was while pursuing my investigations, into the complaints before referred to, that there appeared in the "JOURNAL" (Feb. 5, 1895) a notice of apparatus designed to determine with accuracy and precision the presence and percentage of hydrocarbon vapours in any given atmosphere. Originally intended for testing the air in coal mines, it had been successively adopted for detecting inflammable vapours in the holds of ships engaged in transporting petroleum, and then for testing the air in the boxes and culverts of electric lighting distributing-plants. The alarming and deplorable explosions which have occurred in these boxes demanded that some accurate and reliable apparatus should be available for investigating the cause and preventing their recurrence. The apparatus designed by Mr. Boverton Redwood and Professor Clowes is so delicate in its application, that it will unfailingly indicate the presence of one-half of one per cent. of gas in the atmosphere. A sample of

any suspected air can be taken in a collecting vessel, and removed for after-examination. I was not able to take advantage of this invention myself, as the price when the apparatus was first brought out was prohibitive. It did occur to me that the agents, or some other enterprising individuals, might send the collecting vessel to be charged, and afterwards test the contents for a reasonable fee, or that they might collect and test the sample themselves, charging therefor, and so obviate the necessity of small gas undertakings possessing themselves of an expensive apparatus which they might have only rare occasion to use.

I am glad to be able to-day by the kindness of the agents for the Redwood and Clowes gas-detector—viz., the Gas Lighting Improvement Company, Limited—to show you the contrivance, of the value and usefulness of which there can be no question, as I understand it is now in constant use for the detection of inflammable vapours in electric street boxes and channels. Mr. Hall, the Engineer to the Company, will kindly explain the *modus operandi* of the apparatus.

It must be nearly a quarter of a century ago, when—troubled with a complaint that the gas of a company I was then with was making itself noisome and offensive by getting into a dwelling-house where no gas was laid on—I appealed to a gentleman high in the gas profession for some means whereby I might distinguish between coal gas and sewer gas, and was informed there was *none* other than the nose and sense of smell. Science in that domain, as in others, has now provided us with other resources.

Discussion.

Mr. T. Bower (West Hartlepool) said that some of the points raised by Mr. Tobey in his paper were, he might almost say, unique. There was one point in the first case he gave, which struck him as somewhat peculiar. It was towards the end of the second paragraph. Perhaps in West Hartlepool they lived in a modern town; but they found that if their gulley-pipes were so arranged that gas could get through to the slop-stone, they would be very much surprised at it. They had them so cut off that no gas—neither coal gas nor sewer gas—could get into the houses. It might, however, be very difficult to discover whether the gas coming into the house through the slop-stone trap was coal gas or sewer gas. One of the first steps that he should take, if called upon to investigate a case of this kind, would be to cut off the slop-stone pipe, and satisfy himself whether it was coal or sewer gas. He only mentioned this by the way; and no doubt Mr. Tobey would give the meeting some explanation whether the gas came straight through into the drain. In regard to the case which was illustrated on a drawing before them, there was no doubt that many escapes, and much trouble and expense, were occasioned by the leaving in the soil of old pipes. He did not refer solely to gas-pipes or sewers, but to pipes of any description. He had found, from personal experience, that one of the very worst things they could do, when laying a new pipe, was to leave the old one down. Some people said it was not worth the trouble of taking out an old 4-inch pipe when laying a 6-inch one; but it seemed to him that it was their paramount duty to take out the old pipe. They did not know who was to follow them; and they ought to make it as easy as possible for those who were to succeed them to do their duty. While they were doing this, they would be obviating such a difficulty as Mr. Tobey had mentioned to them. He was very much interested with the apparatus which had been shown to them; and he would like very much to hear something more about it. He had himself tested with this indicator; and if he were to give his opinion of it, he should say it was very small. It might possibly be that they manipulated it wrongly; but their experience at Hartlepool was that they did not get any satisfactory results from the apparatus. Especially was this so when the escape of gas was only slight. The greater the escape of gas was, the better were the results from the detector. If any apparatus, such as that before them, could be proved to be effective in testing for leakages—either of coal gas or sewer gas, or in detecting between the two—then he thought it would be found to be very serviceable.

Mr. David Terrace (Middlesbrough) mentioned a circumstance which was perhaps unique in reference to elusive leakages. It happened about a year ago, in a street in Middlesbrough. There was a fractured main; and they found afterwards that the gas, instead of coming to the surface, on account of the frost, leaked into a drain. The peculiar thing was that it caught fire in the drain, although there was no possibility of light getting near it, as far as they could conceive. The only way they could detect it, was by the heat on the paving-stones. This led to their digging down, when they found the fracture. Their experience did not lead them to understand how it was possible for an escape to take fire in a street drain, when there was no light in it. He did not know if there was a possibility of the gas taking fire itself. It was, perhaps, such a case as Mr. Tobey might have made use of, if he had known of it.

Mr. W. Ford (Stockton) said that a similar occurrence happened with him about two years ago, as that to which Mr. Terrace had referred. Unfortunately, it was a Corporation drain, which was a cost to themselves. It was nearly 300 yards away; and they had an explosion in the back premises of a cottage, without any light seeming to have been applied. But he differed from Mr. Terrace on the question of the possibility of an explosion taking place without light. He questioned very much if coal gas, whether mixed with atmospheric air or not, could explode of itself. He should like very much that some of their scientific friends would clear the matter up. However, their man went into the back yard, thought he smelt gas, struck a light, and an explosion occurred instantly, and he was put on his back. Some of their friends in the northern portion of the district had very serious difficulties to contend with, in regard to leakage. All their streets were made upon large pieces of slag; and these pieces of slag were put down by their road surveyors, he was sorry to say, without any idea of regularity. Then when a steam-roller went over them, it very naturally broke the mains and service-pipes. He had known escapes to be percolating through the ground before they could discover where the broken main was. He was sure that if anything could be made which would detect these gas leakages, and localize them, it would be a boon to Mr. Terrace and himself. He might say that now—with great care and attention displayed with reference to the condition of service-pipes and mains, and by the use of the instrument shown by their friend—he had been enabled to reduce his leakage to 4 per cent., by which they were able to sell gas at 2s. per 1000 cubic feet. They did not compete with South Shields or Newcastle, where gas was sold at 1s. 8d. per 1000 cubic feet; but in reducing the leakage, they had been able to lower the price of gas to 2s.

Mr. J. Whyte (Seaham Harbour) felt particularly interested in the subject Mr. Tobey had brought forward, from the simple fact that his leakage was a very heavy one. If they could find means by which to reduce it, he should be very pleased indeed. Some few years ago he was called upon about an explosion of gas in a house, which did some considerable damage. When he went to the place, he said he did not think it had been coal gas. Gas was burning with a blue flame at the skirting for about a yard and a half on each side of the fireplace. His men worked for two or three days, and they succeeded in getting the smell removed, and, as it was supposed, the leakage as well, though he, for his part, did not understand it, because they had done nothing, so far as he could see, that could have stopped a leak. But the fact was it was merely stopped in the meantime. In the course of a few weeks, the smell was as bad as ever; and he spent pounds upon pounds in searching for the leak. He insisted that it was sewer gas; but, on the other side, they insisted that it was coal gas, and that they would sue the Gas Company. He offered to come to an arrangement, whereby he would strip his mains, and if a leakage of coal gas were found, he would pay all the expense, but failing that, he would charge the consumer for it. They would do nothing of the kind, as they said they had found the leakage. He was very pleased to hear it; but the smell was there still. In a few weeks, it was found that it was sewer gas. The trouble was that when the wind blew from the east, the house was all right; but when it blew from the west, the nuisance was there. He had had considerable experience in these cases. It was a most destructive thing when gas got into a common sewer. He fancied that there was no possibility of telling the difference between sewer gas and coal gas after it had travelled a certain distance in the earth and got into a drain. He considered that they were sometimes blamed for coal gas leakages and explosions, when, after all, it was not coal gas.

Mr. J. Hepworth (Edinburgh) said that no one in the room regarded this matter with more interest than he did, because, as had been already pointed out in the debate, what was wanted was an instrument which would indicate about correctly the nature of the gas which was found to be escaping. He was sorry to hear from Mr. Bower that his experience with the instrument before them was not altogether satisfactory. He hoped that this might be due to the fact that he was not in the habit of using the instrument every day; and that if he had had more experience with it, the results might have been more correctly ascertained. He once had considerable difficulty in discerning the nature of a gas which was said to be escaping from a certain main. He was sorry to say that all the intelligence that could be brought to bear upon the matter, from both sides—from the local surveyor, and any intelligence he could bring to bear upon it—did not absolutely clear it up at the time; neither had it been, perhaps, quite cleared up even to this day. Very serious interference had been brought about by the extension of the railway system; and there was no doubt that there was a very offensive smell finding its way into a valuable block of property. The sanitary department, of course, said it was coal gas; and the gas department, of course, said it was sewer gas. He believed that if he were to be accepted as judge in the case, he should have no hesitation in saying that it was pure sewer gas; and in fact, after certain things had been done to the drains, the result was the abolition of the long-continued nuisance, which seemed to indicate that this was the source of it. But what would have been valuable at that time, and what would have saved all the dispute—which extended over a considerable period—and would have saved all the nuisance, which had lasted for a considerable time, would have been an instrument like that which had been introduced to them that day, which would have indicated the exact nature of the gas with which they had to deal. It was, of course, a friendly dispute; one believed that it was coal gas,

and the other believed that it was sewer gas. The instrument now shown, he thought, would have told them exactly what it was. If this were within the power of the instrument, he could not conceive of anything more valuable than it would prove to be.

The PRESIDENT said the question of leakage was one which troubled them all more or less; and it was one which they were all anxious to see reduced to the lowest possible minimum. But it required very constant supervision if they were to attain good results. Fractured mains, which perhaps were now more common since steam-rollers of 10 or 15 tons weight were brought upon their roads, would account for not a few of the leaks which occurred; and especially in the case of old mains which were laid very shallow, they would have more fractures than if they had been laid deeper. The circumstance which had been detailed before them by Mr. Whyte brought to his mind an instance where a complaint had been made in a small village with which he had some connection, of an escape of gas. It had continued for several years. Efforts had been made to discover it; and, so far, no coal gas had been found. He thought he was in a position now to discover whether it was coal or sewer gas, because the whole of the mains in the neighbourhood were about to be renewed. The experience of Mr. Whyte was so peculiar that he should be somewhat disposed to think that it was coal gas which was travelling a considerable distance, and getting its outlet there. They were all very much indebted to Mr. Tobey for bringing the subject before the meeting, and showing them the leakage indicator, which should be very valuable to them.

Mr. TOBEY, in reply to Mr. Bower's remark about the drains, said that it was the fact that in some cases the drains were connected straight through to the slop-stone. They were not all in such a good condition as regarded sanitary matters as they appeared to be in at Hartlepool. He knew that the proper thing was not to have a single drain in a house, but to have all outside; that was the course which was pursued in regard to all modern dwellings. But they must remember that there were some old buildings left. Mr. Terrace spoke of a case in which gas had fired in a drain. How this had occurred, he could not possibly imagine. It appeared to him that spontaneous combustion could not possibly take place. It might, of course, arise in the event of some chemicals coming into contact with other chemicals; but they all knew that purified coal gas required a very high temperature to fire it. How the gas in Mr. Terrace's case became ignited, was, he thought, a problem which could not be solved. Mr. Whyte had spoken of an experience of his, in which the gas lit along the side of the walls, and burned with a blue flame; and he came to the conclusion that it was sewer gas. He (Mr. Tobey) should have come to the entirely opposite conclusion—that it was coal gas. To his mind, it was impossible for sewer gas to ignite. He did not think there were the elements for ignition in it. He did not see what properties there were in sewer gas which could ignite. Sewer gas was composed to a very large extent of carbonic acid. There was, of course, sulphuretted hydrogen in it, but not in sufficient quantity to burn. It would be simply impossible, to his mind, for ordinary sewer gas to ignite. He thought there must have been an admixture of coal and sewer gas. He could quite see that there might have been some petroleum poured into the drain some distance away; and the vapour of this might have travelled along and burned. Mr. Hepworth had spoken of the value of the apparatus which they had before them. There was no doubt that it was a most valuable apparatus; and in cases of dispute—where one said it was coal gas, and the other said, equally emphatically, that it was sewer gas—they might fall back upon an apparatus of the sort, and ascertain whether it was coal gas or not. It would be a very great advantage to have some test of this sort, so that they might say with "dead" certainty whether it was coal gas or an admixture of coal gas with any other gas with which they were dealing. There was the chloride of palladium test, which was described before the German Society of Gas Engineers. It appeared to be very good, and would possibly be of great value if they could follow out the test which they recommended. It was a test by a solution of chloride of palladium. He obtained a solution to try it; but it did not seem to answer to the description given in the paper—that was to say, a piece of paper which was exposed to coal gas did not blacken as was said. However, on turning up a book on chemistry, he saw that there were two qualities of palladium; and it was very possible that he had the wrong one. He hoped to get the right one next time, and to try it again.

Mr. HALL (representative of the manufacturers) then fully explained the action of the Redwood and Clowes gas detector, and illustrated its working. The apparatus was in two forms—a large and a small, the latter (mounted on a tripod) being used for the detection of gas in electric light culverts.

REVISION OF RULES.

The PRESIDENT explained the nature of several alterations the Committee proposed to make in the rules of the Association; and on his motion, they were unanimously agreed to.

ELECTION OF OFFICE-BEARERS.

The SCRUTINEERS (Mr. G. A. Allan, of Wallsend, and Mr. J. Hall, of West Pelton) reported the result of the ballot for the election of office-bearers. They mentioned the curious circumstances that for the post of Auditor three gentlemen had received equal votes; and that, to fill three vacancies on the Committee, four gentlemen had been nominated and had received equal votes.

The PRESIDENT announced that the following had been elected unanimously:—

President: Mr. J. H. Penney, Secretary to the South Shields Gas Company.

Vice-President: Mr. J. Holliday, Scarborough.

Secretary and Treasurer: Mr. W. Hardie, sen., Newcastle.

Coming to the office of Auditor, he found that Mr. W. Hardie, jun., of Tynemouth, Mr. W. B. Davidson, the Secretary to the North Shields Gas Company, and Mr. M. Fligg, of Redcar, had each received the same number of votes. In giving his casting vote, he said it would scarcely do for Mr. Hardie to audit his father's accounts; and Mr. Fligg was a little out of the way. He therefore gave his casting vote in favour of Mr. Davidson. For the three vacancies on the Committee, Mr. C. D. Drury, of Sunderland, Mr. W. D. Gibb, of Elswick, Mr. W. Hardie, jun., and Mr. H. Tobey had received equal votes. Neither Mr. Drury nor Mr. Gibb had been on the Committee previously; and he declared them elected. As between Mr. Hardie and Mr. Tobey, he thought that their offices should be somewhat widespread; and he gave his casting vote to Mr. Tobey.

Mr. PENNEY returned thanks for his appointment to the office of President.

It was resolved that the next half-yearly meeting should be held at South Shields.

Mr. PENNEY, seconded by Mr. TOBEY, proposed a hearty vote of thanks to Mr. Lees for his conduct in the chair.

Mr. LEES acknowledged the compliment.

Mr. FORD proposed a hearty vote of thanks to Mr. Hardie for his long and faithful services to the Association, as Secretary and Treasurer.

Mr. HARDIE, in acknowledgment, said it was nearly twenty years since he became Secretary to the Association. He had been in the same office from the commencement of the Association; but he was afraid that this would be his last year, and he hoped they would be looking out for someone who would be able to take his place.

At the close of the meeting, Mr. J. Redman, of the Incandescent Gas Lighting Improvement Company, showed his arrangement for obviating the effects of lateral vibration in street-lamps fitted with Welsbach mantles. He mentioned that, by striking the pillar, he had broken 65 mantles mounted in the ordinary way, and had not broken any which were mounted according to his system. Mr. Henry J. Davis showed some "Holophane" globes as applied to argand and incandescent burners.

The members and friends afterwards dined together in the County Hotel, under the presidency of Mr. Lees.

OHIO (U.S.A.) GASLIGHT ASSOCIATION.

Annual Meeting at Cincinnati.

The Twelfth Annual Meeting of this Association was held at Cincinnati, on the 18th and 19th ult.—Mr. J. W. GWYNN, of Bucyrus, the President, in the chair.

Some time was occupied in the preliminary courtesies of welcoming the Association to Cincinnati; and several visitors who were present were personally recognized from the chair, and made appropriate replies. The principal feature of interest in the report of the Executive Committee (which was adopted unanimously) was the election of General Hickenlooper, who was the first President of the Association, to honorary membership. A list of 17 applicants for membership was submitted to the meeting, and unanimously adopted.

The President, in the opening of his Inaugural Address, referred to the fact that they had come back, for their twelfth annual meeting, to the city where their first meeting was held; and he traced the progress to the present day. The Association now numbered 174 members, and was the largest State Gas Managers' Association in America. He claimed that a State Association was better able to deal with matters of a local nature than a National one; but he advised membership both in a State and in a National Association. A new feature to be introduced at that meeting would be a private sitting, the proceedings of which would not be reported, and at which matters of a private nature could be freely discussed. He enlarged on the importance of more united action among the members in regard to legislative matters. In the past, these had been left entirely to a few of the larger companies; but he considered that the smaller undertakings should aid, and stand their share of the burden. Union was strength; and it was to their interest to unite in the protection of their rights and privileges, which were placed in jeopardy by the tendency of modern legislation to increase the taxes put upon public companies. The taxation question was becoming of great importance, and needed their combined influence. After glancing briefly at improved gas-burners as lately introduced, the President went on to say that but little progress had been made during the year in the cheaper production of calcium

carbide; but he was informed that a block in Philadelphia was lighted by means of acetylene gas generated on the premises. In concluding, he noticed several matters of special interest to the Association.

In passing a vote of thanks for the address, special allusion was made by Mr. Cantine and by General Hickenlooper to the active efforts that had been put forth by the President in the way of resisting hostile legislation.

The first paper read was by Mr. B. P. Holmes, of Youngstown (Ohio), and dealt with the utilization of ammoniacal liquor in small gas-works. He found that even the larger gas undertakings in the district only utilized the liquor in a half-hearted sort of way; and works carbonizing less than 4000 tons of coal a year let it go to waste. Many vendors of sulphate plant sought to contract for the product over a long term; but he was able to buy a set of the Feldman apparatus, which was successfully used in Germany, without any restriction of the sort. He had had it in operation since December, 1894; and the cost, inclusive of substantial buildings, was about £500. It was rated to boil off 5 tons of liquor per day of 24 hours; but he found it would do 10 tons. The apparatus was then described in detail, with the aid of a diagram. His working for the year 1895 showed a production of 16 lbs. of sulphate per ton of coal carbonized. The value of the sulphate made was nearly £300; and the working expenses were less than half this sum.

Discussion being invited, Mr. Irvin Butterworth said that at Columbus he made concentrated liquor, and not sulphate. He saw no reason to question the figures given in the paper, which certainly showed that any company using 2000 or 3000 tons of coal a year could utilize the ammoniacal liquor. Mr. Osius, in the course of some remarks, pointed out that the average cost of repairs, as based upon the first year's working, was delusive; as, when the apparatus was well used, they would be much greater. He considered it was possible to do as well by concentrating the liquor as by making sulphate; and the former was simpler, and did not involve handling sulphuric acid. Mr. Thompson asked if Mr. Holmes extracted the whole of the ammonia from his gas. Mr. Humphreys said he could do better with aqua ammonia than by making sulphate. Mr. Hayward remarked that the figures given in the paper consisted largely of estimates; and he would like some information as to the cost of acid. Mr. Jenkins had made some inquiries on the subject of working up ammonia; and found that several gas companies were concentrating liquor, and two were making sulphate. All were satisfied with the results; but the prices obtainable at present were not so good as at first.

Mr. Holmes, in replying, justified the estimates he had given of the cost of labour, &c., as being, if anything, too liberal. He also thought that, from the character of the apparatus, no heavy expense for repairs need be anticipated. His scrubber was of an old-fashioned kind, and probably did not take out all the ammonia from the gas. He purchased 66 per cent. acid, and diluted it as required: but did not feel at liberty to state the cost. He mentioned that his apparatus could be adapted for concentrating at a cost of less than £20.

Mr. E. H. Jenkins followed with a paper in which he dealt with several minor items, any one of which would not furnish sufficient material for a separate communication. Among other topics, he enlarged on the importance of weighing accurately the whole of the coal carbonized, which he considered as important as measuring the make of gas. He recommended the use of a spray of water to partly cool the coke as it was drawn from the retorts, and also the liberal use of pressure-gauges throughout the works. In measuring the gas, it was necessary to see that the water-line of the meter was accurate, as well as to correct for the temperature of the gas. He had found a memorandum book, in which various matters relating to the consumers were put down as they came to hand, of great service in connection with troublesome customers. For instance, the treasurer of a church came and complained that the gas bill was double the usual amount, and refused to pay it; but he was able to tell him, from the memorandum book, that several extra services had been held during the month in question.

Mr. Allen commenced the discussion by illustrating the importance of a little private detective work in connection with disputed accounts. In nearly all cases the cause of an account jumping up to double the usual amount or so, could be ascertained by the exercise of care and patience; and he did not believe either in accepting an estimated sum, or in letting the customer go away unsatisfied. Mr. Butterworth thought it was possible, by judicious liberality, to make friends of, and establish a good feeling with, the customers. Mr. M'Ilhenny agreed that a voluntary concession, granted without compulsion, was always appreciated; and he advocated fair and liberal treatment of the consumer. He had found that many people who complained about a month's gas bill were satisfied when told the average cost per day, which was always a mere trifle. For the service afforded, nothing was so cheap as gas; and people did not remember that it was always available day or night. It was a very easy matter to divide any month's gas bill by thirty. Mr. Doherty said he considered one objection to keeping close watch on the consumers was that they would suppose it was done for the purpose of estimating their accounts. He would suggest that a collection of the various anecdotes relating to consumers that were told at their meetings should be made, and published in book form. Then, when a consumer came in to complain, hand him the book. Mr. M'Donald said that, instead of running the supply pressure too low, it would pay better to repair the mains. Mr. Holmes had lately introduced the plan of having the quantity consumed entered in the meter-book by the inspector, who was instructed to make inquiry at once, if the consumption appeared abnormal. Mr. Hamlin was in favour of investigating all inconsistencies—of course, in a fair and inoffensive way; but he added that 95 per cent. of the meters that went wrong told against the sellers, and pointed out the importance and advantage of having more frequent testings of meters.

A paper on "The Extension of Mains and Services into New Territory" was read by Mr. George Light, of Dayton. In wide streets, especially if a street-car track was likely to be laid, there should be a double line of mains; and connections might be provided for a large trunk main, which might be required at some future time. Before deciding to lay a main, not only the present available business, but also the possibilities of the future, should be carefully considered; and as a general rule, the mains should be laid wherever there was a fair prospect of business. If the footway was wide, he preferred to lay the main inside the curb; and if this was not practicable, just outside. The district should be canvassed, with a view of getting as many services as possible put down while the main was being laid. Some judgment was necessary as to laying services free; but in any case the company should retain ownership up to the meter, and if a charge was made it should be for excavating only. He heard of a case lately where a person was sued for burning gas without a meter, and was charged with connecting his pipes to the company's service. He produced a receipted bill from the company for the service; and the judge ruled that it was his own property, and therefore he could do as he liked with it.

Discussion having been invited, Mr. Penn said he laid free service-pipes, and extended the mains wherever he could get a consumer per 100 feet run. Mr. Thompson said that in his city it was customary to charge the consumers in sparsely populated districts with a share of the cost of the main, but to refund such payment when a sufficient amount of custom was obtained. Thus the consumer had a direct interest in extending the business of the company. He did not believe in laying services till they were actually required. In Missouri anyone using gas without permission was liable to a fine of £60 or three months' imprisonment; and the existence of a connection was sufficient evidence of such usage. Mr. Jenkins quoted a case showing that it was desirable that the main-tap, as well as the service-pipe, should belong to the gas company.

(To be continued.)

Manchester District Institution of Gas Engineers.—The Hon. Secretary of the Institution (Mr. S. S. Mellor, of Northwich) asks us to notify that the next quarterly meeting will be held on the 16th instead of the 30th prox., in order to avoid clashing with the Whitsuntide holidays.

Presentation to Mr. Thompson Nash.—On Wednesday last, at the offices of the Commercial Gas Company, Mr. H. E. Jones presented to Mr. Nash a purse of gold and a silver inkstand (subscribed for by the staff of the Company and a few friends) upon his resignation of the position of Accountant. Mr. Jones conveyed to Mr. Nash the good wishes of his late colleagues, congratulating him upon his retirement after 34 years of active service. Mr. Nash, in replying, said he was deeply moved by this testimony of the consideration of the officers of the Company, and he should always remember with pleasure the kind expressions of Mr. Jones in making the presentation.

Presentation to Mr. Ackroyd Bower.—Last Thursday evening, the officials and employees of the gas and chemical departments of Messrs. W. Dixon, Limited, met in Ancell's Rooms, and made a presentation to Mr. W. Ackroyd Bower, who has had the management of the recovery plant for treating the furnace gases at the Govan and Calder Iron-Works during the past four years, and who is now leaving Glasgow to take up his new appointment as Manager of the Whitwood Chemical Company at Normanton. After partaking of dinner, the presentation, which took the shape of a gold watch and a massive English chiming clock, was made by Mr. Thomas Miller. Mr. Bower having suitably expressed his gratitude for the tokens of esteem, the rest of the evening was spent very pleasantly in entertainment. Mr. Ackroyd Bower, who has had large experience in connection with the treatment of furnace gases and the designing and erection of gas plant generally, and the extraction and working up of the bye-products, received his early training with Messrs. R. and J. Dempster, of Newton Heath. He is a brother of Mr. T. Bower, Assoc.M.Inst.C.E., of West Hartlepool. Previous to taking the management of Messrs. Dixon's works, Mr. Bower superintended the erection of the Carnbrae recovery plant; and on its completion he was appointed Manager. It may interest many of our readers to know that the volume of gases dealt with for the extraction of ammonia and tar products by the Govan and Calder works amounts to 100 million cubic feet per day. This great bulk of gas is due to the large amount of blast that mixes with gases in the blast-furnaces; and it necessitates a very extensive gas-recovery plant for extracting the bye-products.

A NEW AND ABUNDANT SOURCE OF THE RARE OXIDES OF THORIUM, CERIUM, YTTRIUM, LANTHANUM, DIDYMIUM, AND ZIRCONIUM.

By Dr. T. L. Phipson.

[From the "Chemical News," March 27, 1896.]

It has been known for a long time that most of the minerals containing the rare oxides of the metals thorium, cerium, yttrium, lanthanum, didymium, and zirconium are attacked by acids; and I have been able to prove that these minerals, or at least the oxides which characterize them, are more or less widely dispersed through the Norwegian granites. Probably this will be found to be the case with granites from other localities; but my present remarks apply only to the former.

A good many years ago, I extracted considerable amounts of zirconium from the zircon-syenite of Norway, of which I brought various specimens to England in 1860, all of which had been seen and verified by the celebrated geologist Dumont, of Liège. In this case, however, the oxide of zirconium was extracted by the usual process; and it served me later to obtain the metal zirconium by the action of magnesium. I may take this opportunity of stating that M. Moissan has recently been kind enough to point out in the "Comptes Rendus" that this was the first time the metal zirconium had ever been obtained in a state of purity; and he adopted the process in his new researches on that metal.

Being convinced that the rare oxides above named must be widely dispersed throughout the granite rocks of the regions where their minerals are found, I made a number of experiments, not only with the zircon-syenite, but with the ordinary Norwegian granite ("crust" or "tender") which is used along with "Blue Guernsey" and "Aberdeen" for the kerbstones which pave the road in which is situated my new Casa Mia Laboratory, at Putney. This granite has flesh-coloured and white (or greenish white) felspar, with black mica. The latter, however, becomes quite white after the acid treatment to which I am going to refer.

About 15 to 20 grammes of the rock, reduced to a very fine powder, are heated with pure hydrochloric acid, just as if it were a sample of ironstone. After the acid has been kept gently boiling for about an hour, water is added; and, after depositing, the clear liquid is carefully decanted off through a filter. Another lot of pure acid is then poured over the residue, and it is boiled again in the same manner. A few crystals of chlorate of potash are added, to ensure that all the iron is in the state of peroxide. The residue may be digested for two or three days with strong sulphuric acid, and afterwards heated, diluted, filtered, &c. But the extra yield of oxides is very small; and the hydrochloric acid treatment alone appears to extract all that is worth having.

The diluted hydrochloric acid liquid is saturated with ammonia until only a very small amount of free hydrochloric acid remains, and then an excess (about a gramme) of crystals of oxalic acid is thrown in and dissolved by stirring. The liquid, having stood for 24 hours, is decanted from the precipitate, and the small quantity of free hydrochloric acid is exactly saturated with ammonia. It is then allowed to deposit its oxalates again in presence of an excess of oxalic acid. In this manner the rare oxides are classified into two categories—those of which the oxalates resist a little free hydrochloric acid, and those which only resist free oxalic acid.

The oxalates, being dried and calcined, yield a mixture of the rare oxides and carbonates of the metals mentioned above, much cheaper than by employing the expensive minerals thorite, orangite, cerite, gadolinite, monazite, pyrochlor, eudialite, &c., usually required for this purpose. The oxides named have been tolerably well characterized in the products obtained as above. But I can give no idea of their respective quantities, more than to say that ceric oxide, yttrium, and didymium, with lanthanum, appear the most prominent; while thoria and zirconia were somewhat less abundant. Very slight quantities of some metal (or metals) precipitable by HS (black precipitate in acid liquid) are also present. By the above process, I obtained 1·93, or nearly 2 per cent., of rare oxides and carbonates. This yield shows that there are, dispersed through the Norwegian granite (independently of the zircon-syenite), hundreds of tons of the rare oxides which can be promptly and easily extracted, and to some extent separated by the process I have just described.

The calcined oxalates from the liquor containing a little free hydrochloric acid yield a brick-coloured mixture of oxides and carbonates, which contains cerium oxide with zirconia or thoria (or both) amounting to 0·33 per cent. This yields to hydrochloric acid 0·03 of an oxide (yttria or lanthana), giving a very bulky oxalate. The oxalates from the liquor containing only free oxalic acid yield, on calcination, a greenish brown, or brown, mixture of oxides and carbonates, which colour is not due to manganese (which is not precipitated in the above circumstances), and amounting to 1·60 per cent. This product also contains much cerium oxide, with didymium, lanthanum, and yttria.

Acetylene for Tramcar Lighting.—Acetylene is being tried on some of the tramcars in Paris. The light is stated to be very efficient; while the cost, so far as the experiments have gone, works out at less than that of lighting by petroleum.

PREVENTING DAMAGE BY LEAKAGE OF WATER FROM LARGE RESERVOIRS.

In a paragraph in the "Journal" for Dec. 3 last (p. 1145), we briefly noticed an article by M. Dutoit, in the "Annales des Ponts et Chaussées," on the subject of the prevention of damage to large reservoirs by the leakage of water caused by the expansion of the masonry used in their construction. The following abstract translation of the article, furnishing additional particulars, is taken from the "Engineering Record":—

Since it is impossible to protect large reservoirs from variations of temperature, and since the consequent expansions and contractions of the masonry are much beyond the limits of its elasticity, they usually produce cracks in the reservoir walls that generally occur near the middle and extend across the invert or bottom surface, where a series of intersecting cracks may also appear, all tending to open in the winter and close in the summer. If the cracks are mended, they will either reopen the next winter or new ones will appear adjacent to them. It is therefore useless to repair them; and the efforts made should be in the direction of preserving the structure and preventing trouble from the loss of the water. The writer describes the methods adopted in the construction of the most recent Paris reservoirs to prevent the possibility of damage to the foundations by infiltrations, as well as the methods successfully employed by the Paris Water Department for several years to maintain the efficiency of the reservoirs, notwithstanding their cracks.

The walls and bottoms, or inverts, of the Paris reservoirs are constructed entirely of a local silicious stone called *meulière*, and so built with cement mortar as to form homogeneous monolithic masses, which it would be sufficient to proportion for stability and set on the solid earth, if it were not for infiltration of water, which inevitably evades the utmost vigilance, and must be provided for, especially when its action would produce such injurious effects as disintegration, slipping, or dissolving of the subsoil.

The reservoir of Villejuif was built in 1881-2, and rests on a bed of gypsum and marl, which would endanger its stability if exposed to moisture. The reservoir at present consists of two of the four ultimate compartments, each of which is 236 ft. by 131 ft. by 16 ft. The side walls are made so as to be stable without reference to the pressure of the exterior soil; and the bottom is made hollow with top and bottom inverts, each 15·75 inches thick, separated 4·9 feet, and designed to form two series of elliptical tunnels 9 ft. by 4·9 ft., intersecting each other at right angles in the floor, and separated by pillars 3·9 feet square at their smallest point. The roof vaults are plastered with portland cement mortar 1·18 inches thick, and the side walls with Vasy cement mortar 0·75 inch thick. The lower inverts of the double floor are also plastered with 1·18 inches of cement mortar, which is continued from the springing line of the upper invert to cover the sloping pyramidal surface of the foundation pier, upon which the upper part is afterwards constructed. The intrados of the upper invert is left bare, so that any infiltrations or leakages from the reservoir above may easily penetrate it, and be collected on the continuous plastered surface of the tunnels and piers, and conducted through the former to the drains. Around the outside walls of the reservoir is a trench filled with broken stone, and having a sloping plastered bottom, from which drains to the floor tunnels are intended to carry off any water that may leak through the walls, and so prevent any outside pressure. The floor tunnels are capable of inspection. The reservoir is roofed by brick vaults, supported wholly independently of the side walls, and made of bricks laid flat on the centres. The bricks at the lines of intersection of the crossvaults are made with a special angle. The skewbacks are cut by hand. The vaults are made with two thicknesses of brick cross-jointed. In laying the arches, the special intersection bricks are set first. A slow-setting cement is used; and the work is done with great care—being covered with boards as fast as completed. The vault is plastered with 1·18 inches of cement mortar, and the centres struck after three or four days; then a filling of weak concrete is laid 11·8 inches deep above the springing line; above this a ¾-inch layer of portland cement plaster is spread over all, and pierced at its lowest points with drain-pipes. Gravel is filled on top up to the crowns of the arches; and above it a depth of 15¾ inches of vegetable mould is placed.

The Montmartre reservoir has a total capacity of 2,900,000 gallons, and occupies 2750 square yards. It is composed of five completely isolated and independent compartments in two groups—one three, and the other two storeys high. The foundations rest on a bed of very fine yellow sand, about 16 feet thick, overlying deposits of gypsum; and independent walls have been built outside the foundations, to prevent the possibility of the sand flowing into adjacent quarry-pits. The bottom is similar to that of the Villejuif reservoir; having a total thickness of 12·4 feet, and being transversed by intersecting galleries, which are large enough to receive the pipe-line. Any water penetrating the gallery masonry escapes freely through its unplastered intrados, and is collected on its invert, which is plastered with cement mortar, 1·18 inches thick, to a height of 19½ inches, and thence drains down slopes of 2 in 1100

to the sewer. The outer walls are filled in with broken stone, and drained as at Villejuif. The foundation under the lower galleries, or the lower invert, is composed of a continuous bed of concrete 29½ inches thick; the lower one having a mean thickness of 19½ inches, and an undulating upper surface, which is plastered with portland cement mortar, and drained by 3·9-inch tile-pipe laid in the trenches with open joints, and emptying into the public sewer. The upper layer of concrete is laid directly on top of the drainage-pipes, and is 9·8 inches thick. The outer walls of the reservoirs are strengthened by iron ties built into them at about the levels of the overflows. These ties are of 3 inch by ¾ inch iron bars 16·4 feet long, and connected at the angles by eyes and vertical anchor-rods 1·9 inches diameter and 3 to 7 feet long. They are set about one-third the thickness of the wall from its inner face, so as to be protected as much as possible from variations in temperature. Where the stairway shafts pierced the walls, the ties were carried round the four sides of the shaft, and connected on opposite sides to the main line.

When cracks are discovered in the inverts, the 1·18 inch plaster surface is removed for about 2 or 2½ inches each side of it, and the crack through the masonry thoroughly cleaned out by a steel blade and well washed. A thin strip of board or cardboard is inserted in the crack, and Vasy cement is filled in on each side of it. Then the strip is withdrawn, leaving a regular opening; and the fresh cement surface is heated and thoroughly dried by charcoal furnaces. After this, 1½-inch strips of pure unvulcanized caoutchouc are spread over the crack on the hot cement, and soldered with a solution of rubber in benzine. Then the remaining space is filled with cement mortar up to the general surface of the invert. This last upper layer of cement usually breaks; but the flow of water is stopped by the caoutchouc, while the open space below it allows for the expansions and contractions of the masonry.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

The Incandescent Gas-Lighting Lawsuits.

Sir,—Will you permit us a short reference to your article of last week, as far as it refers to the case just decided in our favour by Mr. Justice Wills. Your reference seems to us hardly consistent with your constant sense of fairness. To quote the Judge as depreciating our mantle, is to do that which he has himself specifically disclaimed. His exact words were as follows:—

> "It is true you get much less light than by the Welsbach process. For many purposes, probably that is no disadvantage. And you get a yellowish, instead of an absolutely white, light, which also, in the opinion of many people, is no disadvantage. With the relative merits of the resulting mantles, however, I have nothing to do."

It must be remembered that neither we nor our opponents were showing in Court *how much* light we could give. In another passage, the Judge rendered full justice to the "great strength and tenacity" of our mantle.

We do not hesitate to claim that, when our new factory is at work, and we enjoy the same advantages of organization and manufacture as the Welsbach Company do, the public will not be long in realizing that the advantages in light, and colour, and strength all lie on the side of what Mr. Swinburne called "the cheap edition" mantle—not on the side of the expensive and fragile "rare earths."

Will you at the same time allow us to correct the impression that *we* sought to destroy the Welsbach patent. Our interest lies, of course, in the opposite direction; and, as pointed out by our Counsel to the Judge, our pleadings made it quite clear that we only relied on the arguments directed against the patent itself to meet the absurdly wide construction sought to be put on the Welsbach claim by Mr. Moulton, and now altogether repudiated by the Court.

We rely on your kindly giving space to these observations, which will, we have reason to believe, not be without interest to your readers.

J. A. Campbell, Secretary,
Sunlight Incandescent Gas-Lamp Company, Limited.

39, *Coleman Street, E.C., April* 27, 1896.

The Capital Expenditure of the Commercial Gas Company.

Sir,—My attention has been called to your editorial of the 14th of April, in which you make it appear that this Company is "stinting." I suppose Mr. Livesey's observations led you to this conclusion; but if you had heard my observations in reply, you would have seen that there is no special care used in the expenditure of this Company's capital now, but that it has always been most carefully employed—not "stinted" as you might call it.

While futile experiments in costly appliances have been studiously avoided, there has always been the most liberal provision of works, plant, and mains; and as a fact, this Company has a very much larger margin of surplus power of supply than either of the other Companies serving the Metropolis.

Whenever the present extreme prostration of trade in the East of London is removed, and the sale of gas *pro tanto* increased, the capital, and consequently the dividend charge, will stand, per unit of gas sold, some 30 per cent. less than it does even at the present, by the employment of this surplus power.

The bankers' loan, which puzzles the superficial observer, simply replaces the large accumulations of surplus profit which were formerly employed as floating capital, and which, in my hope and conviction, will before many years be replaced, and would be replaced the sooner if only our larger and more important, but not proportionately more valuable neighbours, would act with us and together in that concerted union which must give strength and ensure prosperity.

Commercial Gas Company, Stepney, April 27, 1896. Hy. E. Jones.

The Accident to the Gasholder at Gothenburg.

Sir,—I hope you will allow me to add a few remarks on the above subject. But I must first correct an error in my letter in your issue of the 14th inst. In paragraph (3) "Enormous Play," it is stated that "I was not aware that remarks could be made against shallowness and the want of bottom rollers in my holder;" whereas it should have been printed that I was "not *unaware*" that they could be made. I certainly knew that my holder was not satisfactory to English constructors; and therefore I hoped, by laying the particulars of the accident and the construction before your readers, to have the reasons for the accident cleared up the sooner.

After this correction, it is superfluous to answer Mr. F. S. Cripps's notes (1) to (4). I only hope that experienced men will not let the question as to bottom rollers *over* the water drop. In note (5), I regret to find that Mr. Cripps, who (*ante*, p. 570) decidedly declared the causes of my accident to be shallowness, want of bottom rollers, and enormous play in the guiding, now moderates his opinion, and finds it "strange that the Gothenburg holder was upset when fully inflated, and not at a lower level." Mr. Cripps's opinion that "the water in the cups might have been very low, possibly due to the tilting and jamming of the holder at a lower level," has no foundation after my repeated statement that the water in the cup was measured an hour before the fire, and the cup as full as it could be at a tilt of 7½ inches; and a Piggott's cup of ⅜-inch boiler-plate is not likely to be jammed.

As regards the cup, I also must correct the apprehension of Mr. Cripps about the tilting needed for "blowing." The cup is 18 inches deep outside; because of the bed-irons in the bottom, the depth inside is stated to be 16½ inches (*ante*, p. 627). But as the dip is provided with an 8-inch high screen-plate to guard against overflow, as shown in the diagram already given (*ante*, p. 24), there would be needed, before "blowing," a tilt of 16½ in. + 8 in. ÷ the gas pressure, 5½ in. = 19 in. Yet I have observed "blowing," as mentioned before, at a little more tilt than 16 inches.

I am very thankful for the information supplied by Mr. Cripps in other respects; and I may still furnish drawings and details of the holder wished for.

Gothenburg, April 18, 1896. Hy. Samzelius.

Gas-Ovens for Disinfecting.

Sir,—Whether the opinions of some unknown workhouse officials, and a visitor, are to be taken in preference to the published results of Koch, Pasteur, and others of equal fame and skill, I do not intend to discuss. That some persons have faith in the possibility of disinfection of clothes and bedding by dry heat is a fact, and an unfortunate one. I made no statements, but simply quoted the actual results obtained by experts, who have devoted the greater part of their lives to the question at issue. As a maker of special apparatus for sterilizing and bacteria cultivation, I have for the last ten years had exceptional opportunities of knowing both the methods and the results obtained. It is possible to destroy living vermin in clothes in a gas-heated oven, provided the clothes are well opened and the folds separated. But this does not destroy the eggs; and a short period is only required to fill the clothes again. This is not disinfection in any sense.

Warrington, April 23, 1896. Thos. Fletcher, F.C.S.

Oriental Gas Company, Limited.—The Directors have resolved to pay an interim dividend at the rate of 3½ per cent., free of income-tax, on account of the year ending June 30, 1896. The dividend will be payable on and after June 4 next, and is at the same rate as last year.

The Laindon Gas and Water Scheme.—A meeting of the local ratepayers, property owners, and occupiers has just been held at Billericay, "to consider the subject of the Provisional Order now before the Board of Trade, whereby it is proposed to authorize the construction and maintenance of gas and water works and to supply water within the parishes of Laindon Hills, Lee Chapel, Laindon, Little Burstead, and Great Burstead (inclusive of Billericay)." Mr. W. Clement West presided. The meeting refused to hear Mr. Davis, solicitor, and Mr. T. W. Tabret, one of the promoters of the scheme; and in the end they passed a resolution against assenting to the Order. The prevailing (but, of course, mistaken) impression was that, if the Order were assented to, the inhabitants of the district would be compelled to take water, whether or not they wanted it. Subsequently, the Parish Council of Billericay endorsed the decision of the meeting.

Extension of the Wetheral Water Supply.—Under the advice of Mr. J. Hepworth, a water supply scheme for Wetheral was recently carried out. The amount borrowed for the purpose was £1200; but the Carlisle Rural District Council were fortunate in obtaining low tenders for the work, and they had a balance of £235. Since then they have applied to the Local Government Board for sanction to the borrowing of a further £785, to enable them to extend the supply to Cumwhinton, and Broadwath and Burnriggs. Their proposals were the subject of inquiry by Colonel C. H. Luard a few days since. Evidence was given by the Medical Officer (Dr. Macdonald) as to the doubtful purity of the water supplies in the districts to which the extensions were intended to be made; and Mr. Hepworth gave some particulars regarding the cost of the work. It transpired that the Cumwhinton extension had already been made; and the Inspector stated that he was perfectly sure the Board would not sanction the borrowing of the money for that portion of the work, nor could the balance on the Wetheral scheme be used towards paying for it, unless the money had been borrowed from the Public Works Loan Commissioners. Mr. Lonsdale, the Clerk to the Council, mentioned that the balance had been so spent, and that there were debts outstanding to the extent of £205. In concluding the inquiry, the Inspector requested Mr. Lonsdale to supply the Board with a detailed statement of the cost of the works that had been executed.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week:—

Bills read the first time and referred to the Examiners: Brighton Corporation Water Bill, Colwyn Bay and District Gas Bill, Fylde Water Bill, Guildford Gas Bill, Ilfracombe Gas Bill.

Bills read the third time and passed: Cupar Water Provisional Order Bill, Malvern Link Bill, Padiham Urban District Council Water (Extension of Time) Bill, Ystradyfodwg Urban District Council Gas and Water Bill.

HOUSE OF COMMONS.

The following progress was made with Bills last week:—

Bills read the first time and referred to the Examiners: Malvern Link Bill, Padiham Urban District Council Water (Extension of Time) Bill, Ystradyfodwg Urban District Council Gas and Water Bill.

Bills read a second time and committed: Bonnybridge, &c., Water Provisional Order Bill, Portsmouth Borough Water Bill.

Bills reported: Lanarkshire (Middle Ward District) Water Bill, Matlock Bath Gas Bill, South Metropolitan Gas Bill.

Bills read the third time and passed, with amendments: Cheltenham Gas Bill, Dewsbury and Heckmondwike Water Bill.

Bills referred to a Select Committee consisting of Mr. Seale-Hayne (Chairman), Colonel Long, Mr. Mildmay, and Mr. M'Ewan, to meet on Tuesday, April 28: Bexhill Water and Gas Bill, Bournemouth Gas and Water Bill, Eastbourne Water Bill, London Sea Water Supply Bill, and Portsmouth Borough Water Bill.

Sir John Brunner, Mr. Baldwin, Mr. Bond, and Mr. J. Stuart have been appointed by the House as members of the Committee on the London Water Companies' Bills; and they will sit with the five members—Mr. Briggs, Mr. Lewis Fry, Mr. Lees Knowles, Mr. Muntz, and Sir J. Pease—nominated by the Committee of Selection. Sir J. Pease will, it is expected, be Chairman of the Committee.

HOUSE OF COMMONS COMMITTEE.

Tuesday, April 14.

(*Before Sir* W. CODDINGTON, *Chairman; Sir* L. LYELL, *Viscount* WEYMOUTH, *and Mr.* JOHNSON-FERGUSON.)

MATLOCK BATH GAS BILL.

On the resumption of the proceedings this morning, further evidence was given for the promoters. This was briefly summarized last week (p. 871).

Mr. *H. Buxton*, a member of the Matlock Bath District Council, said he thought the present site of the gas-works was a wrong one; and to his mind the removal of the works to a spot not surrounded by a population would be a great advantage to Matlock Bath.

In cross-examination by Mr. LITTLER, witness said he could not, from his own knowledge, state how much the removal would cost, but he had heard £10,000 mentioned. He thought there would be some saving by a change of site, and increased revenue from the sale of gas. They would not have to carry coal from the railway station, which now cost 10d. per ton. With the works on another site, this would only amount to 2d. per ton.

Mr. LITTLER: You are one of those who advised the ratepayers to go in for this Bill. Do you know how many years' purchase will be required for compulsory purchase?

Witness: Eighteen years.

Well, at that rate, the purchase of the works will cost £24,000, which is £1600 per annum, and 1d. in the pound only produces £38. For this you have an income of £972, and in addition a saving on the cartage; so that there will be a charge upon the rates of something like £300 a year?—We shall have our prices cheaper.

Did you tell the ratepayers of Matlock Bath that there would be an addition of 1s. 6d. in the pound to the rates; and if you did, do you think that there is any one who would vote for the Bill?—I do not see that there will be any great addition to the rates.

Cross-examined by Mr. RICKARDS, witness said the purchase of the gas-works had been discussed for about 15 years.

In reply to Mr. SHAW, witness said one of the chief reasons for the present Bill was the desired removal of the gas-works. There was no compulsory clause binding the promoters to remove them, as they did not think one was necessary.

Mr. RAM (interposing) said the promoters would have no objection to putting in a clause to the effect that they would carry out the removal within five years.

Re-examined by Mr. RAM, witness said that, to meet the expenditure about which Mr. Littler had asked him, they would have the income of the Company they were purchasing, which was put at £972. Besides this, they sought by the Bill a considerable extension of the area of supply. They anticipated from this an increase of income. In the opinion of the Council, on the figures supplied by Mr. Stevenson, there would not be a loss to the ratepayers owing to the gas supply passing into the hands of the promoters; while it would, on the other hand, be a benefit to the town.

Mr. *Tyack*, a hotel proprietor, expressed his desire for the transfer of the gas-works to the Local Authority.

Mr. *M. Fox*, who had been employed in managing the gas-works in 1859, but had left on account of ill-health, said they were so situated as to make economical working impossible. He thought they should be removed to a better site.

Mr. *W. Jaffrey*, the Surveyor to the Matlock Bath District Council, said he applied to the Gas Company for permission to survey the works, but was refused. When he tried to get in, the police kept him out. He went on to give statistics of the gas supply in the locality, to show how it was affected by the levels. Witness thought that not only in this respect but also in the matter of haulage the proposed site for the new works would be a decided economy. Having furnished statistics as to the acreage of the various portions of Matlock district supplied by the respective Gas Companies, he gave the populations of the whole of the urban districts in the county comparable with Matlock Bath, to show that the latter place was reasonably rated, whether the gas and water undertakings were owned by the Local Authority, and also taking into account the School Board rates. He said Matlock Bath was increasing, and moderate-sized villas were being rapidly erected. One estate was being developed, and at the present moment a hundred villas were being erected.

In cross-examination by Mr. LITTLER, witness said that out of the places compared with Matlock Bath as to rates, fifteen were rated lower than the Matlock Bath district for the general district rate. As to the proposed site, it would be connected with the London and North-Western Railway; and although it was close to the canal and the water-works, he spoke professionally when he said that there would be no danger to the former from the excavations for the gas-works.

Mr. *E. H. Stevenson*, M.Inst.C.E., examined by Mr. RAM, said he had visited Matlock Bath, and inspected the gas-works as far as he was able. It was possible to see practically the whole of them from the station on one side of the hill or the other; and so, in spite of the refusal to admit him into the works, he was able, by inspection from the neighbouring premises, to inform himself of their nature. A great deal of the plant was quite new, and only a portion of the buildings appeared to be old. He considered the site of the works altogether a bad one, owing to its being so near to the station and in a populous part. It was on a hillside, and very liable to slip. It was a very steep pitch, and this increased the cost of getting materials up to the works. He had known of gas-works being removed from the centre of a town owing to the smell. This was done at Scarborough. He inspected the new site as he passed it. It was in a good situation, and he did not see that there could be any objection to it. The tendency of late years was for gas-works to pass into the hands of local authorities; and, according to his experience, Parliament had favoured the practice. There was no hardship upon the Company, whose works it was proposed to purchase, seeing that they would be purchased at full value according to arbitration. Last year, just before applying for statutory powers, the Company raised a further capital of £1000, and borrowed £2000 upon mortgage. They used the £3000 in increasing the works and acquiring new plant. The Bill proposed to take in new districts, and increased revenue was to be expected from the added area. The Council would certainly not carry their mains into those districts unless they saw a profit before them, because the whole of the loss would fall upon the district of Matlock Bath. It was proposed now to make the illuminating power of the gas 18 candles, which would give a better light than the 15 candles, and cost little more to produce.

Mr. RAM was about to read to the witness Colonel Addison's report to the Board of Trade on the application of the Gas Company for a Provisional Order (see *ante*, p. 816), with the view of putting some questions to him on the subject, but the room became so dark from the prevailing fog that he was unable to proceed.

The Committee then adjourned.

Wednesday, April 15.

On the Committee re-assembling this morning,

Mr. *Stevenson* was further examined by Mr. RAM, on Colonel Addison's report. A letter was also read from Mr. Pelham, Assistant-Secretary of the Board of Trade, in which it was stated that on the report the Board proposed to issue the Order.

Mr. RAM: Mr. Littler put some figures before the witness to prove that if the Bill were passed it would be an improvident arrangement for the ratepayers of the district. What is your opinion about that?

Witness: My opinion is that it will be for the benefit of the ratepayers of the district. The Local Authority will have a good paying concern, bought at a price which will pay them well. I know of very few cases—indeed, I do not know of any case—in which a local authority, having purchased a gas undertaking, has not in course of years paid itself.

That is as to the general principle. But as to this particular undertaking. We know that the borrowing powers of the Local Authority are £19,000; and we know that at present the burden upon them is £5700 for the water undertaking?—But that is a profit-earning undertaking which is practically no burden upon the rates, and will shortly be a valuable asset to the authority. There is a sum of £6000 which they will have to expend upon the drainage works; and these two together—even supposing the water undertaking is no burden upon the ratepayers—will still leave a sufficient balance for the purposes of the Bill.

Do you regard it that the present gas undertaking will be a burden on the ratepayers?—No, certainly not; I am absolutely certain it will not.

You say that, having regard not only to the fact that the gas undertakings in the hands of local authorities are always paying concerns, but also that this undertaking might be better managed than it is to-day, a saving would be expected?—Yes; the District Council would get the benefit of that.

In further examination, witness stated that it would be necessary to have a new site for the works, and even with this there would practically be no loss at all. There would be an increase of business; and a larger number of visitors and residents would be attracted to the locality. There would also be a saving of directors' fees, and the saving of haulage and cartage; and these, with the increase in the prosperity of the town, would be all for the benefit of the locality. Questioned as to the difference in price between statutory and non-statutory companies, witness said it was about 25 per cent., all the circumstances being the same; but wherever an undertaking was sold under arbitration, the circumstances of the case were taken into consideration. The periods varied from 29 years, which was the highest, to

something like 19 years. With regard to non-statutory companies, he did not know any arbitration where more than 20 years' purchase had been given. The Matlock Bath Gas Company was at present a non-statutory one.

Mr. RAM: You have just heard the report of Colonel Addison read. Should the Provisional Order be granted, it is his recommendation that the Company, for the purpose of the purchase, should still be regarded as non-statutory. It is, therefore, your opinion that the Company should be bought as a non-statutory undertaking on such a term of years as would make it a paying and not a losing concern to the purchaser?

Witness: Certainly; or I should not have advised the District Council to proceed.

Cross-examined by Mr. LITTLER: Each case had to be decided upon its particular circumstances. In the present one, there were conditions which would have to be taken into consideration by the arbitrator. The Company had asked the Council to make them an offer; and he understood that to mean that the question was simply one of price. The Council were prepared to pay what an independent arbitrator and umpire would say was the fair value of the property. They considered it far better that the purveyors of gas should have sole control of the roads of the district. There was no desire on the part of the Council to make profit. They wished to give a fair capital and commercial value for the undertaking; and he thought £11,500 was a fair price, based upon seventeen years' purchase of the profits the Company could earn. The Company did not spend sufficient for proper management. He defied any expert witness to go before an arbitrator and say the Company had laid out anything like an adequate sum on wear and tear in 1895. Witness was about to be questioned on the Chesterfield case, when

The CHAIRMAN said he did not think it was necessary to go into that. Mr. Stevenson was a Gas Engineer, and understood his business very well. He had stated that, in the Chesterfield case, 23 years' purchase was paid for. This Committee had nothing to do with assessing value. Assuming they passed the Bill, the valuation of the works would be handed over to some other authority. They had nothing to do with actual value.

Mr. LITTLER: Not directly; but indirectly you have. In the first place, we are not a statutory Company, but we have established by forty years' use the right of carrying on our business. If it comes to a sale, we shall inevitably not get the full price for the undertaking; and it ought not to go to arbitration at all. I ask the Committee to look at the hardship of sending us to arbitration, unless a public case is made out; and I say no such case is or can be made out.

The learned Counsel then put a series of questions to the witness as to the management of the Company.

The CHAIRMAN: It has been admitted all through by the other side that the works have been well managed. We know there are always complaints about the quality of gas, even when the works are managed by local authorities.

Mr. LITTLER: Then *cadit quæstio*. If there are no complaints against us as to the quality of the gas, and yet we are to be deprived of our works, there is no use in my continuing my evidence or argument. It is the first time I ever heard of such a thing.

Witness: Oh, no; it is not. There are two precedents.

Mr. LITTLER said there were two precedents as to water, but not as to gas; and there was a material difference between water and gas supply.

The CHAIRMAN: We recognize that; and the Committee will keep it in view in deciding whether or not the preamble is proved.

Mr. LITTLER: Here is a Company whose price is declared to be moderate, whose capital expenditure is said to be moderate, and yet we are to be compelled to sell.

The CHAIRMAN remarked that the Committee had not expressed any opinion in that direction.

Witness was being questioned as to terminal charges, and as to the price of gas in Matlock Bath as compared with that charged by other companies of similar dimensions, when

The CHAIRMAN said the Committee might take it that the Company charged a fairly reasonable price for their gas.

In further cross-examination, witness went on to say that the fault to be found with the Company was the excessive leakage. They had had to supply gas at unusually high and low levels, and the irregularity of pressure might be corrected by properly placed governors.

Mr. LITTLER: Are you anticipating a reduction in price if the works are taken over?

Witness: We may not reduce it at present, but we anticipate that before long we may do so.

Questioned by the CHAIRMAN, witness adhered to his estimate that £11,500 would be a fair price for an undertaking making the quantity of gas produced by the Matlock Bath Company. Of course, the estimate depended upon the earnings, and the net annual revenue of the Company might be taken at £700. Some of this was derived from gas-fittings and stoves.

Mr. *W. R. Chester*, the Gas Engineer of the Nottingham Corporation, was next called, and examined by Mr. RAM. He stated that the site of the present works was unsuitable, and the works ought to be taken entirely away from it in the interests of Matlock Bath as a health resort. The proposed site was well arranged and admirably adapted. The alleged drawback of a short-distance rate for coals would, after deducting terminal charges, be practically nothing. He had examined the accounts of the Company, and found that the repairs and renewals for 1894 worked out to £210 9s.

Mr. RAM: Are you of opinion that, if a fair price is paid by the Local Authority, they will be able to work the concern in the future in such a manner as not to ensure a loss to the ratepayers?

Mr. LITTLER: That is a matter for the Committee to decide.

Mr. RAM: I submit I am entitled to put that question to an expert witness.

The CHAIRMAN: You say "a fair price;" but the point is, what is a fair price? As that is a question entirely for the arbitration, I do not think it is a question that is material in any way.

In cross-examination by Mr. LITTLER, witness said that if the works were in going order, he would not throw money away by expenditure; but sufficient ought to be spent. He did not know that revenue had been spent on renewals, which really should have been charged to capital. He could only speak from what he saw in the accounts. He was present at the inquiry by Colonel Addison, but was not called.

Mr. LITTLER: Why?

Mr. RAM: It was done for this reason—that we were anxious the Committee should be entitled to deal with the whole matter, that we might get just such a report as Colonel Addison has presented, and that we should not have to pay a higher price than for a non-statutory Company.

The CHAIRMAN (to witness): What is your opinion as to the value of these works?

Witness: With a company having a large consumer taking nearly a third of the whole gas, I should think £600 per million cubic feet.

But the works have been built for many years, and what alterations and additions were required were done. What would be your opinion of the value in these circumstances?—About £750 per million.

Do you consider that it was reasonable to pay 7½ per cent. dividend on the old capital, and 4 per cent. on the preference shares?—That would be reasonable.

Mr. LITTLER: That is not what they were limited to but what was actually paid.

This closed the case for the promoters.

(To be continued.)

SOUTH METROPOLITAN GAS BILL.

This Bill, which is to provide for the conversion of the capital and debenture stock of the South Metropolitan Gas Company, for the representation in the management of the undertaking of employees holding ordinary stock, for the transfer of such stock, and for the acquisition of additional lands, came before the Committee at the close of the proceedings on the Matlock Bath Gas Bill; Mr. Bemrose sitting in place of Viscount Weymouth.

Mr. POPE, Q.C., Mr. BALFOUR BROWNE, Q.C., and Lord ROBERT CECIL appeared for the promoters; Mr. WORSLEY TAYLOR, Q.C., and Mr. KEMP, for the London County Council. In the case of the Corporation of London, Counsel were reserved.

Mr. POPE, in opening the case for the promoters, said: This is a Bill promoted by the South Metropolitan Gas Company for some important purposes; the main being the conversion and commutation of its stock, taking it at its nominal value, and reducing it in nominal amount to a lower rate of interest, so as to make it practically more valuable, both for the purposes of the shareholders and of the public. The conversion is this: It is provided for in section 4 of the Bill which is before you, and in a manuscript or printed addendum to the section as it was originally drawn. Mr. Livesey, the Chairman of the Company, and other witnesses will explain what the nature of the change will be. Generally, it amounts to this: The total capital of the Company, divided at present into "A" stock, "B" stock, and "C" stock, is about £2,259,000. Upon this stock, dividends are paid to the full statutory amount, and more; because the sliding-scale having been applied to certain stocks of the Company, they are entitled to a certain increase over the ordinary dividend in proportion to the reduction of price. The proposition is to deal with the whole of this stock in the way of giving to the shareholders a proportionate amount of stock representing a 4 per cent. dividend, instead of the 10 or 12 or more per cent. which is paid at present. In other words, speaking roundly, if it were 5 per cent., it would double the annual amount of the capital entitled to only half the dividend; and therefore the amount of the profit divided would remain the same, practically, as it is now. Several companies have of recent years found this step desirable; because the Committee will easily understand that £100 worth of stock which realizes (say) £315 or £320 in the market, is not so readily dealt with as a stock of half the amount which will only command a small premium. Any purchaser looks twice before he gives £315 for £100 worth of stock; although, of course, if he only took the trouble to work it out, he would find that the income amounts to 4 or 4½ per cent. on the price paid. The effect of this conversion would simply be to give to the purchaser on the amount of his stock the actual representative of the dividend which he realizes if he pays £310 for his shares. There are many little advantages with regard to the conversion, which Mr. Livesey or others will explain to you; but I have stated the main object in connection with the conversion of the capital into the nominal amount. But, through the lower statutory dividend, there is also an equalization of the rates of the various classes of stock "A," "B," and "C," so as to bring them all within the operation of what is now known as the sliding-scale. This gives them all an equal interest in the economical management of the Company, because, according to the reduction in the price of gas, their dividend is proportionately increased. At present the "B" stock—which is by far the largest of any of the three—does not participate in the advantages or responsibility of the sliding-scale stock. It is desirable that it should do so; and therefore the scheme is not merely to reduce the value, so to speak, or double the nominal amount of stock, and so reduce its value, but also to make all the stocks equal, and so convert them into one uniform stock paying a uniform dividend, and subject to the uniform sliding-scale. I need not examine the sliding-scale; but it is worth while bearing in mind that it operates emphatically in favour of the consumer and the public. The sliding-scale works in this way: On every penny reduction in price below the standard price which is fixed in the original Act of Parliament, the shareholder is entitled to divide an extra ¼ per cent. The actual effect of this, in figures, is that the total amount of the reduction of a penny upon the price of gas represents a lump sum of about £34,000 or £35,000. The operation of the sliding-scale is to give the consumer the benefit of something like £34,000 out of a penny reduction; and to the shareholders, in the shape of dividend, £5000 odd. The interest of the consumer in the sliding-scale is therefore very much greater than that of the shareholders. It is an operation in favour of the public; but the public pay for the advantage the additional ¼ per cent., or £5000, a year to the shareholders, who are

entitled to divide it in addition to their ordinary dividend. That is the principal object of the Bill; and I will not say more about that in opening the matter, because it will be so much better explained by Mr. Livesey. I must, however, tell you a little history in the matter. Railway stock has been more or less divided for some years. Many railway companies have found the advantage of dividing their stock—dividing their stock paying dividend—into deferred and preferred stock with advantage to all concerned; but the system has not been very frequent in regard to gas undertakings. In relation to water, I am not aware that it has ever taken place; and I do not very well see how it could, for the conditions under which water capital is issued are different from those regulating gas capital. In the case of the Crystal Palace District Gas Company, Parliament sanctioned, a few years ago, this multiplication of capital, with a division of dividend. Last year we came with a suggestion that we should be allowed to divide our capital—making our new capital dividend bearing to the extent of 5 per cent., which would have been, of course, roughly, the doubling the capital and halving the statutory dividend. We came before a Committee of this House, of which the Hon. A. de Tatton Egerton was Chairman; and in the result they thought that the question was so large that it ought to be dealt with on some general consideration as to the effect on the capital of gas and water companies. In the same session, however, two other Committees of this House found themselves strong enough to deal with the matter; and they sanctioned the conversion in the case of the Scarborough and Newmarket Bills, notwithstanding that my learned friend for the County Council seems to have been successful in frightening the Hon. Tatton Egerton. The Bills were similar to that which we are now promoting, as to conversion of capital; and they received the sanction of Parliament—our Bill being withdrawn, on the intimation we received from the Hon. Tatton Egerton. There were, as I say, two Committees that passed similar Bills; and I will give a list of the Bills which have been dealt with from the commencement of this discussion—Bills which have been passed in the same spirit, and in the same interest. I will go into this matter, because it is a little important and interesting. The Bristol Gas Act of 1891 converted the capital, which consisted of £511,000 bearing a maximum dividend of 10 per cent., into £1,022,000 of 5 per cent. stock. In principle, that is what we are asking the Committee to do now. The unissued capital of £67,000, with a 10 per cent. dividend, was authorized to be raised as £134,000 with a 5 per cent. dividend. The nominal capital was doubled; but the statutory dividend was reduced by one-half.

The CHAIRMAN: That was a private Gas Company?

Mr. POPE: Yes. In all these instances, the legislation has been special on behalf of an individual company, for whose benefit the enactment took place. I was not in the Bristol case; but I am told by a gentleman who was concerned in it, that the Corporation opposed, and raised exactly the question which the County Council are doing on the present occasion. In 1892, the Oxford Gas Act was passed. As a summary of the case shows, there being various rates of dividend payable on the existing stock, the conversion was proposed of £96,780 of various capitals into £143,892 of 5 per cent. stock. The difference between this and the Bristol case was that in the latter all the capital was reduced from 10 per cent. to 5 per cent., while in the case of the Oxford Company, it was all brought to a common stock bearing 5 per cent. dividend. Originally, the Oxford Corporation took an unfavourable view of the proposal. They, however, became satisfied that the consumer would not be injured by it, but, on the contrary, would be, if anything, benefited. They therefore withdrew from opposition; and the Bill passed as an agreed measure. In 1893, the Crystal Palace District Gas Act was passed, practically to the same effect, doubling the capital, with a 10 per cent. dividend nominally, in amount, but with 5 per cent. secured. In the following year (I have given you cases in 1891, 1892, and 1893), the Plymouth and Stonehouse Act was passed. A learned friend reminds me that I was responsible for representing the County Council in the discussion in 1893 on the Crystal Palace District Act; and now that he has brought it to my mind, I remember it perfectly well. It had escaped my attention at first, for I did not take the point of objecting to the conversion of capital. Of course, I should have done so had I been so instructed; but I was not, and therefore I am not in a position to eat my words of that year. The point was not raised. The opposition turned upon the ordinary questions which arise in connection with gas undertakings generally. Well, as I say, in 1894 we had the Plymouth and Stonehouse Gas Act. It was a conversion of capital bearing 10 per cent. interest into 5 per cent. stock; and last year there was our own application, which resulted in that expression of opinion from the Hon. Tatton Egerton's Committee, which, perhaps, I had better read exactly, so that we may know what it is: "The Committee consider that the subject of the conversion of stock is one of so far-reaching importance, that it ought to be dealt with by a Committee especially appointed to consider the same as affecting gas and water companies;" the fact being that my learned friend, who then represented the County Council, took advantage—no doubt because it was a tactical question—of the excitement which prevailed among you in regard to the purchase of the London Water Companies. Last year, you know, we were in the throes of a discussion as to how to constitute a central authority for the purchase of the Water Companies; and the County Council, of course, took a very active part in it. They urged on the Hon. Tatton Egerton's Committee that, if they converted the gas stock as we desired, by some mysterious influence—which I was not able to comprehend then, and which I am still unable to understand—it would affect the amount the County Council would have to pay for the Water Companies when they came to buy them. I do not know how it was that Counsel was able to convince the Committee that there was any connection between gas and water questions; but they did do so, because the Hon. Tatton Egerton's Committee spoke of gas and water companies as though they were the same.

The CHAIRMAN: He does not refer to water companies in that decision, does he?

Mr. POPE: Yes. He says—"to consider the same as affecting gas and water companies." Then the same year the question came before two other Committees of your House, as I have told you; and they felt themselves strong enough to deal with it in Private Bills, as they were asked to do. The Newmarket Gas Act was simply for the conversion of £30,000 ordinary into £60,000 new stock, by consent. The Scarborough Gas Act was to authorize the Company to convert all the ordinary capital—partly 10 per cent., partly 7½ per cent., and partly 7 per cent.—into 5 per cent. consolidated stock, in the proportion which arithmetically was necessary. Perhaps the best thing for me to do will be to ask you to allow me to hand into the Committee a little *résumé* of legislation on the question; so that, if there is a reference to it, you may see what was really provided for.

The CHAIRMAN: It gives an epitome of the various Acts?

Mr. POPE: Yes. This year similar Bills have been passed by you in regard to Cheltenham, Ilfracombe, and Guildford; and now the South Metropolitan Company come before you.

The CHAIRMAN: The Guildford Bill did not, in one sense, come before us, because it was agreed to, except in regard to some outside opposition.

Mr. POPE: Yes. But you may take it from me that the Bill—though the question did not arise before the Committee—contained this provision.

The CHAIRMAN: We were not aware of it.

Mr. POPE: No. You did not know it because the Corporation, who had opposed on different grounds and were agreed with, had not raised this point—or, at all events, did not continue to raise it—but were satisfied to allow the Bill to pass. That is all I need say, I think, about the conversion of stock. Not only does it operate slightly to the benefit of the shareholder in making his stock more saleable, but it also operates to the benefit of the consumer, because all future stock commands a better price, and that better price does not go into the pockets of the Company. It is not taken as dividend; but is employed as capital. Coincident with this operation, we are proposing in our Bill to convert the privileges of the various stock, and make them all—as in the Scarborough Act—one uniform stock of 4 per cent., which, of course, will be of considerable advantage in the management of the capital account of the Company. It is also proposed, by clause 19 of the Bill, to authorize the Company to convert their existing 5 per cent. debenture stock into a debenture stock bearing interest at a lower rate, but not less than 3 per cent.; and from time to time to convert future debenture stock in a similar manner. That is co-incident with the arrangement of capital stock; and you will deal with it in the same spirit. The object is the same as regards the realizability of debentures. That is the substantial point made in the Bill. It seems to me, I confess, to be a purely domestic matter for the shareholders to decide for themselves, in what form they prefer the security for the capital they subscribe to be given. But the County Council do not think so; and they say the proposal of the Bill may produce some effect on the public. My learned friend will deal with that when he comes to address you. I understand there has been a report made by some authoritative accountant in the employ of the County Council, which makes out that this arrangement will be enormously to the benefit of the shareholders. This, however, is not the fact; some curious fallacy has crept into the mind of the County Council. There is a benefit to the shareholders in having a more easily realizable property than if it represents so enormous an extra premium on the value of the original stock; but it does not amount to very much—not to anything like the fears the County Council have with regard to it. You will hear my learned friend as to whether there is any reason why in this case you should depart from the principle which, in the ten or twelve instances I have given, has been already registered in Committees of Parliament. There are various collateral or subsidiary objects also contained in the Bill. Clause 11 authorizes the Company, before putting up their stock for sale by auction or tender, to offer it to their consumers and employees at the certified market price during the preceding week. It is an extension of the auction clauses, and greatly to the benefit of the consumer; and I may say that the public authority interested in the general question under previous legislation—that is to say, the Board of Trade—are in favour of this extension of the auction clauses. The auction clauses enable us to offer the stock to the public by auction; but before we do so, it is suggested that we shall be entitled to offer it to our consumers and those employed in the undertaking at the certified market price at the time when it is offered. If in the result, or after hearing my learned friend, you should care to know the opinion of the Board of Trade, I think—though it is not the practice for the officials to volunteer themselves to give evidence—I have authority for saying that Sir Courtenay Boyle will come and explain the view of that department.

Mr. BEMROSE: Has that been done in the case of any other of the Companies?

Mr. POPE: I think not. I only suggest this, should the Committee wish to know the opinion of the public department representing the interests of the consumer in the matter. It will also be necessary, if you authorize the conversion, that there should be a corresponding alteration of the sliding-scale to make it applicable to the reduced capital. The standard dividend would be 4 per cent.; and the standard price would remain the same. The amount of the portion of the increased dividend due to the shareholders would, however, require modification, so as to make it proportionate to the present operation of the sliding-scale. There is little alteration—merely for adaptation—in the provision of the sliding-scale, because the Bill would make the operation of the calculation under it half yearly, instead of yearly as it is now. There is a certain convenience in declaring dividends half yearly. The power to calculate whether an increased dividend, or dividend at an increased rate, is payable by reason of reduction of price should, we think, be made at the same time as the declaration of the dividend. We propose that this should be half yearly. We also believe that it would be to the advantage of the Company—and by clause 21 we propose a scheme for the purpose—for the representation of the employees on the directorate, to be subject to the approval of the Board of Trade, which the Company cannot act on until the employees' capital reaches £40,000 nominal, which will exceed £50,000 actual capital. It is a scheme by which the Directors will receive assistance on the Board of certain members elected by the employees themselves. The truth is that the South Metropolitan Gas Company may be taken to have been the pioneer in most of our gas financial improvements—at all events, this is an experiment in this particular direction which, if successful, will probably serve to cement the good understanding which has existed

between the employers and the employees in this Company. The South Metropolitan Company are now on most excellent terms with their employees, and have been so ever since the strike that took place several years ago. The Company hope that the operation of the present Bill will prove a means of maintaining the good understanding which now exists between them and their workpeople, by giving every man a direct voice in the management of the concern in which he is employed. Another provision of the Bill applies to the disposition of the stock of the Company; and a proposal was made on the lines of the rules of the Post Office Savings Bank, in order that people holding stock of £100 or less value should be able to nominate their successors, and so avoid the trouble of making a will. That clause might be objected to, perhaps, on public grounds; but I am informed that this portion of the scheme has received the assent of the Treasury. In any case, however, the Treasury cannot be much harmed, seeing that estates of about £100 are free of taxation. Now I have to come to a totally different matter. We are proposing to acquire a small piece of land from the London County Council, which that body originally acquired from the South Metropolitan Company for the purposes of the Blackwall Tunnel. The County Council do not want the land; and the Company ask the Committee to place a clause in the Bill which will enable them to buy it back.

Mr. WORSLEY TAYLOR said that upon this point he thought an agreement might be arrived at.

The CHAIRMAN asked the promoters of the Bill to submit to the Committee such other Bills as had been passed on lines similar to that they were now considering.

Counsel having handed in a record of legislation with regard to stock conversion,

Mr. *George Livesey* was called, and examined by Lord ROBERT CECIL. He stated that he had been connected with the South Metropolitan Gas Company since 1848. He had been Secretary and Manager, and was now the Chairman. He had had every sort of experience, not only with regard to his own Company, but also in reference to others. So long since as 1865, the sliding-scale was in operation with the Company. In 1876, the Company applied for power to raise additional capital; and the auction clauses were adopted in the same year. Since 1876, these clauses had been brought into operation whenever there had been a sale of stock on behalf of the Company. He desired to explain that, according to present arrangements, nominally £100 worth of stock paid 13 per cent. interest; the maximum value of the stock being £320. The result was the same for all practical purposes as if the money were obtained at 4 per cent.

Lord R. CECIL: The effect of your proceedings would be to reduce the rate at which your dividends stand as compared with capital raised?

Witness: The total capital of our Company is £3,600,000; £600,000 of the total amount being premium money. That premium money has enabled us to build new works at Greenwich at a low rate of interest. The general rate of interest has been diminishing rather than increasing, though our income has augmented.

The CHAIRMAN: Will you please state the amount of the total capital of your Company?

Witness: £3,624,000 has been raised, including premiums; and of this sum, £1,620,448 was obtained at auction prices.

What is the average rate of interest on share capital?—£5 5s. 5d. per cent. on ordinary shares; and £3 15s. 2d. on debentures.

Witness went on to say that in the earlier history of the Company the share capital was sold at 5½ or 6 per cent., and the debenture stock at about 4 per cent. Their last sale of share capital paid the investor just over 4 per cent. In this case, the sale was one of £30,000 worth of ordinary stock; and it realized £320 per £100 of stock. The last debenture stock that was sold realized 172½. All this stock was sold at market price; the stock sale under the auction clauses yielding 13 per cent. This 13 per cent. was based upon the 10 per cent. standard dividend. It should be put to the Committee that the South Metropolitan Company had so reduced the price of gas that they were entitled to increase their dividend to 13 per cent. At present, the price per 1000 cubic feet was 2s. 3d.; but the dividend was based upon a price of 2s. 6d. per 1000 cubic feet. The Company, however, had used the extra money in order to add to their reserve fund, which had been exhausted to the extent of £250,000 on account of the extra cost of coal which had to be met five or six years ago; and, in fact, it went down to as low a figure as £40,000.

Lord R. CECIL: Am I right in saying that, if your stock had been 4 per cent. instead of 10 per cent. stock, it would have entitled holders to payment as at present?

Witness: Yes; there would be no difference.

Under the proposals of this Bill, would you get more for your stock than the nominal price?—No; our point is that you can hardly ask working men to give £320 for £100 of stock. They do not understand the payment of such a large sum; and consequently they do not apply for stock. We have £620,000 of new stock to offer; and if a high price should be realized, it will benefit the consumers only.

Do you expect any immediate financial profit from this scheme?—No; not with Consols touching 114.

Examination continued: It was a fallacy to calculate upon any large increase in the value of gas shares. His Company was an amalgamation of three separate Companies, which was accomplished in 1876; the average price per 1000 cubic feet of gas charged by the three being 3s. 4d. Since that time, the price had been reduced by 1s. 1d. per 1000 feet, which represented an annual gain of something like £416,000 to the consumers. By the reduction in price, the shareholders in the same period had become entitled to an increased dividend amounting in the whole to £81,000 a year. At this moment, the exact sum was £61,000. It was £41,000 when the Company first started. The sliding-scale operated more in favour of the consumer than of the shareholder. It was in 1889 that the Company developed the "partnership" idea, and determined to bring their workmen into the concern. It was his own view that the workman should have an interest to some extent commensurate with that of the shareholder and the consumer.

The CHAIRMAN: What was the plan?

Witness: We fixed our initial price of gas at 2s. 8d. per 1000 feet; and we said that for every penny that we can sell below that 2s. 8d., we will give our employees 1 per cent. on their wages or salary as the case may be. What brought matters to a head was the great labour troubles with which the Company had to contend. At the South Metropolitan works, a Union was formed; and almost every man was forced into it. Then we introduced this profit-sharing system, in order that we might attach the loyal men to us; and those who had not joined the Union at once entered into the scheme. The other men struck against us; but from the time of the settlement of that trouble, we have gone on very comfortably indeed with all our workmen.

Lord R. CECIL: Will you let us know how the provisions of the Bill will benefit your workmen or make investment easier?

Witness: It is very much more satisfactory to a workman that he should have a certificate of his investment showing upon the face of it the amount he has laid out, instead of being put into possession of scrip of apparently nominal value.

Tell us shortly what the proposals of the Bill are?—The proposal is to convert £2,190,000 of 10 per cent. ordinary stock into the equivalent amount of £5,475,000 at 4 per cent. This interest differs from the usual amount where there has been similar conversion; the interest will be 4 per cent., instead of 5 per cent. The only object of the operation is to bring the face value of the stock as near as possible to the market value.

The CHAIRMAN: At what price would the converted stock sell?

Witness: Stock at 4 per cent. would be entitled to £5 4s. per cent.; and £100 worth would sell for about £135.

Lord R. CECIL: You have several classes of stock?

Witness: "A," "B," and "C" stock. The "A" stock represents the original capital of the South Metropolitan Company; and the "B" and "C" stocks the capitals of the Companies that were amalgamated. The "C" stock is that upon which the sliding-scale operates without modification. Of course, the holders of "B" stock do not want the price of gas reduced. The explanation of that is that the small increment of dividend that comes to them when there is a reduction in price is not worth their while troubling about. The advantage of the conversion contemplated by the Bill is that the "B" stock will be brought into line with the "A" and "C" stocks.

What is the public advantage to be expected if the Committee should pass this Bill?—The public importance of the matter is that all the shareholders, as well as the consumers, will have an equal interest in a reduction in the price of gas.

Examination continued: The Act of Parliament required the Company to sell their stock either by public auction or by tender. If the sale took place by auction, the shares had to be offered on the open market, after having been advertised. When the sale was by tender, a minimum price was fixed; and a reserve price could be fixed where stocks were put up to auction. His Company had tried both ways. In the case of auction sales, they found that, if they were really desirous of selling, they had to fix the reserve price at something considerably below the market figure. They found stock jobbers and speculators coming in, who bought up the whole of the stock, and then retailed it at a profit. They changed their system in the light of this experience, and put their stock up to tender; but in the result they only got rid of one-third of the total quantity that they had to offer, and two-thirds remained upon their hands. Then it occurred to the Directors that it might be a good plan to offer the stock to consumers—the Act enabling them to do this at the reserve price. There was no objection made by the Board of Trade; and so they offered their stock at a reserve price, and it was very rapidly taken up. Finding that consumers were so ready to buy stock, the Directors confined themselves to a bare compliance with the provisions of the Act under which it was necessary to advertise sales of stock in two London papers, deliberately leaving over the sales so that they might be made to consumers.

Lord R. CECIL: Well, what is your proposal in regard to that matter in the Bill before the Committee?

Witness: We ask that by this Bill the system of offering stock to consumers may be legalized. Instead of selling our stock by tender or auction, we would like to offer it to the consumers at the market price of the day, as furnished to us by the Secretary of the Stock Exchange.

Will these proposals, if adopted, raise the purchase value of your undertaking?—Not to the slightest extent. Whatever the market value of stock may be, it never forms an element of consideration as to the price to be paid for an undertaking.

What are the elements to be considered?—Earning power.

Mr. POPE: That is so, whether it is water or gas that is in the case?

Witness: Yes; there is no instance in which value has been based on the market price of shares.

Wednesday, April 22.

On the resumption of the proceedings this morning, the examination of Mr. Livesey was continued.

Lord R. CECIL: I am not quite sure that you made clear the auction portion of this Bill. What is the position? Is not the object of the clause to get the best price for the stock?

Witness: Yes; to place the stock at the market price of the day.

And in working these auction clauses at first, you advertised very freely, I believe, in various papers?—We have had altogether 25 sales under the auction clauses. At first, we adopted the plan of advertising; and we spent a great deal of money in that way. In those days it was mainly debenture stock, because we wanted to carry out new works at the lowest possible rates; and we were authorized to raise debenture stock. When that power was exhausted, we had to issue ordinary stock. We dealt with it in the same way; and our experience was that, when the sale came on at the Auction Mart, we had to put the reserve price low to be certain of selling. The result was that large amounts of stock were taken up by speculators. It was all sold; but at less than the market price. The auction had not been going on five minutes before the speculators found out what the reserve price was; and then they got it all.

If you did not fix your reserve price low, you did not sell?—Yes. Next time we did not fix the reserve price so low; and we did not sell. In July, 1890, we offered £25,000 of stock for sale. The mean average price, less the accrued dividends, was £243. We put the reserve at

£242, or one point under the market price; and we sold £11,245 at the auction. The shareholders applied for £3000; and the balance we asked the Board of Trade to assent to our offering to the consumers.

At what price?—At the reserve price. The stock not sold at the auction, we can keep back from sale if we like; but if we want the money, we are bound to offer it at the reserve price, and the Act of Parliament provides that we shall offer it to the shareholders. The next year—that is to say, in March, 1891—we sold £33,500 worth, or put it up for sale by auction; the mean average price being only £230. It was "beared" down to that price. We suspected that the market, for some reason or other, had put the price low in anticipation of the sale. It was known that there was another sale of stock coming on; and quite unaccountably our stock was put down about ten points. We did not like being done in that way, so we put the reserve price at £242—the same that we had sold it for in the previous year. At the auction, £14,000 out of £33,000 was sold. We offered the balance to our consumers, who took it all; and they would have taken a great deal more. At that auction, we realized £12 more than the market price. Then we gave up selling by auction, and adopted the tender system.

The object being in all cases to realize the best price you could for the stock?—Yes; but there is no credit due to us for that; it is to our interest. The lower the rate at which we can raise new capital, the cheaper we can sell gas.

The CHAIRMAN: You have power by Act of Parliament, either to sell by auction or tender?

Witness: Yes.

And you think the present proposal is likely to be beneficial?—Yes. When we found the consumers were so eager for the stock, and would like a great deal more, we complied with the letter of the law as to advertising; but we did not select such papers as would be best to bring the matter before financial people. We got the stock placed at the full market value, and so carried out the spirit of the Act of Parliament. The Board of Trade said they would raise no objection. [Witness put in the evidence given last year by Sir Courtenay Boyle on this point.]

The CHAIRMAN: If we require this evidence, we ought to take it in another way.

Mr. BALFOUR BROWNE said that if the Committee desired to see Sir Courtenay Boyle, and expressed an opinion on the point, he should be called before them; but he had that gentleman's permission to state that he still entertained the view he held when he gave his evidence last year.

Witness went on to say that last December, The Gaslight and Coke Company asked for tenders for £100,000 of their ordinary "A" stock; putting the reserve at £292, which was well under the market price. Tenders were opened on Dec. 19; and the stock was sold at £299½. Less than half the stock was applied for, although it had been extensively advertised in newspapers and by circular. The public took up £49,000; and the balance was offered to the shareholders at the reserve price, and all taken up.

The CHAIRMAN pointed out that a better price had been realized than was received from the shareholders.

Witness said that was so.

Mr. JOHNSON-FERGUSON: You propose to offer shares to the consumers and the shareholders at the market price?

Witness: No, to the consumers. The shareholders will come in later, if the consumers do not take them. We can offer them for sale by auction; and, failing that, they will go to the shareholders.

Lord R. CECIL: The market price has to be certified, but how?

Witness: By the Secretary to the Stock Exchange, on the average of the preceding month. Hitherto the Directors have fixed the price from the best information they could collect.

Mr. JOHNSON-FERGUSON: If this provision had been in force, you would have obtained from the consumers a better price than you even realized from the public or from your shareholders after?

Witness: I think so. At present there is no limit to the amount of stock the consumer can take; but we are quite ready to have a limit of £200, £300, or £400.

Lord R. CECIL was about to examine witness in regard to representation on the Board of Directors of the employees, when

Mr. WORSLEY TAYLOR pointed out that the subject had not been raised in his petition.

Mr. BALFOUR BROWNE therefore stated that, in dealing with the matter of the opposition, the point as to the employees would be gone into for the information of the Committee.

In reply to further questions from Lord R. CECIL, witness stated that he believed the proposal in the Bill would increase the market value of the South Metropolitan Company's stock. He did not believe it would raise the "B" stock, which was three-fifths of the whole. For some unaccountable reason, the Stock Exchange had called that a *quasi*-preference stock, and had always put the price considerably higher than that of the other stocks. Gradually, however, the mistake was being found out; and the value of "A" and "C" stocks had been raised nearly to the level of the "B" stock. Taking the last quotation in the "JOURNAL OF GAS LIGHTING," he found that the "A" stock yielded to the investors £3 16s. 6d.

By the CHAIRMAN: "A" stock had just been sold at over £400. "B" stock was sold on Monday at £316. Taking the highest figure in these quotations, it gave the investor £3 15s. 11d. Within the last few weeks, "A" stock had been brought up in relative value closely to the "B;" but a month ago it was a good deal below it. "A" stock had gone up 20 in the past month.

Mr. WORSLEY TAYLOR (in cross-examination): I think the rate of interest of the South Metropolitan Gas Company, which is now uniformly 10 per cent., was settled in 1860?

Witness: We got the sliding-scale in 1876.

What was the rate of dividend before that?—It was fixed at a maximum of 10 per cent. when we got our original Act in 1842. In 1860, the Metropolis Gas Act was passed, which did not alter the rate of dividend.

In 1876, there was a very careful reconsideration of all these matters relating to capital and dividend?—Prior to 1876, there was a maximum price fixed for gas. It was always higher than was necessary to pay the maximum dividend. The maximum dividend was also fixed; and the result was that the shareholders were constantly clamouring for new issues of stock, which was issued at par. The shareholders were guaranteed practically their maximum dividend, so that it was a very nice thing for them to get these new issues; but the sliding-scale altered this.

The matter was carefully considered in 1876?—In 1875 and 1876.

It was, I believe, started by the Metropolitan Board introducing a Bill on the subject?—A fight took place between the Companies and the Board; and I appeared as a witness for the Board against the Companies, and was called a traitor, and all sorts of things, for so doing. As a result of the fight, the Companies gave way; and a bargain was made by which something was given to the public, and something to the Companies. The Companies gave up their maximum price, and took an initial price which was lower.

Still it was pretty liberal?—It was fair.

You have never required to get up to it?—No.

Instead of 10 per cent., you have a comfortable 13¾ per cent.?—Yes.

The public have had a reduction in the price of gas from 3s. 6d. to 2s. 3d. per 1000 cubic feet?—Yes. The late Mr. Ward, the Solicitor to the Metropolitan Board of Works, who was a most honourable man, said that he would like to see the Companies get 20 per cent., because that would mean that the public would get gas at 1s. per 1000 feet.

In whose interests have the Company promoted this Bill; we have heard a great deal about its being for the benefit of the public?—It seems to me to be in the interests of the public.

First of all in their interests?—Well, I am not going to say that. It will be in the interests of the Company if we can raise our capital at a lower rate of interest.

But is that the consideration which has moved you to introduce the Bill?—It is one thing.

Is it to the interest of the Company?—Well, we thought it would be to our advantage to get rid of divided stock—that is to say, to consolidate.

But you could have done that without splitting?—No, we could not, because that would not be agreed to.

Did you ever try to do it?—No, because it would have been useless to do so. The stock will now have an increased market value. We want to make the concern a genuine co-operative affair. There was a division among us about working men directors; but in all else we were at one. It certainly is to the public interest that the consumers should be able to invest money in the Company.

Which weighed most with you, the interest of the public or of your own shareholders? Was it philanthropy or self-interest that moved you?—The public interest is our interest. There is no philanthropy; but the public interest is our own, and we wish to do good for the public and for ourselves too. The public will get the lion's share of the benefit.

You always put the public first?—Well, why should I not?

There will be some rise in the value of stocks?—Yes.

In further cross-examination, in regard to evidence given by him on a previous occasion as to the operations of the Crystal Palace District Gas Company, witness said he had been wrong in the statement that, immediately after the conversion of that Company's stock, there was a rise from 195 to 205. When he made the statement last year, he had not the figures before him; but he had looked into the facts since, and had failed to find that there was an immediate rise. The stock was changed on Nov. 30, 1893; and he could not find that there was an immediate rise then. There had, however, been one during the year. The rise was gradual. The stock of the Company had been paying 10 per cent. from time immemorial; and there was no danger that this would be interfered with. It was selling in the market at 190, which meant that it paid the investors more than 5 per cent. There was, therefore, in that case plenty of room for a considerable rise. After the conversion, as he had said, there was a gradual rise; but gas shares had improved all round. The South Metropolitan "A" stock rose 19; the "B," 8¼; and the "C" stock, 8. The Gaslight and Coke Company's stock rose 7½; and the Commercial Company's stock, 12.

Mr. WORSLEY TAYLOR: In your evidence last year, you said that the stock had gone up suddenly immediately after the conversion?

Witness: I said that, I know; but I find, on reference, that the rise was gradual. I spoke from memory. Other gas stocks which were not converted rose quite as much.

In reply to further questions, witness said there was not now, in connection with the South Metropolitan shares, the same room for a rise that there was at the time the Crystal Palace Company's shares were converted. He could not say how much of the latter Company's district was within the jurisdiction of the County Council, but he thought only a small piece—enough to give the Council *locus standi;* and being enough they had taken advantage of it.

Mr. WORSLEY TAYLOR: The arrangements in 1876 were with all the London Companies and the public, were they not?

Witness: No; the adoption of the sliding-scale was a voluntary thing. In 1876 there were only two Companies who had adopted it. The Commercial Company adopted it in 1875; and in 1876, The Gaslight and Coke Company (who had absorbed the Imperial and the Independent Companies) and the South Metropolitan Company also adopted it. The last-named Company had parliamentary powers to amalgamate with any Company supplying gas in the Metropolis south of the Thames. Acting on these powers, we in 1879 took over the Surrey Consumers', and in 1880 the Phœnix Company. When these were absorbed, they came under the sliding-scale. The legislation of 1876 now covers the whole of the Metropolis—the three Metropolitan Companies; but it does not include the whole of the suburbs.

The capital of all of them, I understand, is over £15,000,000?—Yes. Our capital out of that is £3,500,000.

The CHAIRMAN: Is that paid up?

Witness: Yes; £2,190,000 is ordinary stock, £220,000 is debenture stock, and the rest is premium—making £3,624,000.

You said the public will get the benefit of the higher price at which capital will be raised. That only applies to future issues of capital?—Yes. But we shall raise more—we are raising £100,000 a year.

Speaking as to precedents, witness said that the Plymouth Bill had been opposed; but the opponents had not contested the conversion

clause. In the Newmarket and Scarborough cases, Parliament accepted the clause at about the period that that of the South Metropolitan Company was rejected. He did not know whether anyone objected in the case of Newmarket; but in the case of Scarborough, the parties were agreed. The Scarborough Corporation considered the matter, and said the clause would not affect them. They thought it might be of advantage to the shareholders; but they were not prepared to act like "dogs in the manger."

Mr. BALFOUR BROWNE said the Oxford case was to have been fought; but when the parties came into the Committee-room, the opposition to the clause was withdrawn. The point was agreed. In the Crystal Palace case, it was not raised.

Witness pointed out that in every case when the South Metropolitan Company had been promoting a Bill, the parishes had always opposed them if they had felt their interests affected, disregarding the opposition of the London County Council. The Company were supplying twenty parishes and district boards, and each of these had looked fairly at the proposal, and had not raised objection to the conversion of the stock. These were the only people interested. The London County Council had no interest in the matter at all.

Mr. WORSLEY TAYLOR: What is the number of your employees?

Witness: Some 4000 in winter, and in summer 500 or 600 less. Our desire with regard to our employees is this: My experience on the Labour Commission, coupled with other matters, showed me that this labour question is one of the most important questions of the day—that employers and employed are in rival camps, and have taken up hostile positions to each other. Our idea is that, if we can identify these interests, and bring them to work together to show that the interest of the worker is in the prosperity of the work in which he is engaged, we shall do well. Our profit-sharing was introduced for the purpose of inducing our workpeople to take an interest in the prosperity of the Company. We thought also that it would be a means of encouraging thrift; and we said to our people; "We will give you such and such on your wages calculated by the price of gas; but if you will leave it in our hands, we will give you 4 per cent., and also invest your savings." To our surprise, nearly half our people have so left their bonus with us. It has been a perfect revelation to me. We have at present something like £35,000 of their money deposited with us at 4 per cent interest. They have also invested their savings in stock. At the beginning of the year, we had £26,000 of these savings in our stock. This profit-sharing should not be confined to the sharing of profits, but should be allowed to grow into sharing responsibility of management. I have consulted a number of eminent men on this matter; and have the permission of the Duke of Devonshire to read his words. This is what he writes: "I have read your memorandum with much interest, and can see nothing but advantage from a public point of view if you are able to overcome the practical difficulties which you say stand in your way." Mr. Mundella has written to me in the same strain, and also Sir Michael Hicks Beach, Chancellor of the Exchequer.

You do not want testimonials, Mr. Livesey?—No; but this is part of the Bill. It is an experiment that everyone says it is desirable to see tried; and we are anxious to try it. If the County Council stand in the way of it, they will be obstructing a public improvement. As I say, it is only an experiment. These men having their savings in the Company will say: "Why should we not have a share in the management?" Of course, if, when they have that share in the management, they do not display any capacity or common sense—which I expect they will show—the whole thing will lapse after a three years' trial. Mr. Perks, one of the ablest and best of the working men, heartily approves of it. As to the consumers, we have 80,000 ordinary consumers. I say "ordinary," because during the last three years we have had an extraordinary development of the penny-in-the-slot gas machines, which has added 50,000 to our consumers.

Re-examined by Mr. BALFOUR BROWNE: The sliding-scale, which was adopted in 1876, was intended to make the interest of the consumers and shareholders one. That was the sole purpose. There was nothing in the Bill which militated against the interest of the public. If the Company had fifty different stocks, it would tend to confuse the purchasers, as the stocks would stand at various prices. Coming to Parliament and converting the stocks all into one, would probably enable the holders to secure a better price if they sold in the market. It would mean a little addition to their capital value; but no increase of their income. That would do no harm to the consumers who had to find the income annually.

Mr. BALFOUR BROWNE: There is the benefit of the shareholders. If they want to raise further capital, it will be a benefit to the consumer, because the premiums will be higher?

Witness: Yes; it will be raised at a slightly lower rate of interest. Therefore the consumer will have to pay less in the price of gas for interest on capital.

I do not know what my learned friend suggests this time; but on the last occasion, he did suggest something about "gas and water." Would there be any advantage to the seller of the whole undertaking, suppose any public body came to purchase it. Would the public authority have to pay any more?—I say not.

Have you ever heard of an authority purchasing upon the market price of shares?—Never. I may say it has never been done.

Are sales always on the basis of revenue?—On the basis of divisible profit.

Mr. WORSLEY TAYLOR: My learned friend has connected my name with "gas and water." I have said nothing about water.

Mr. BALFOUR BROWNE: No; I am pointing out, as it were, that my learned friend has improved since last year.

Witness went on to say that since the passing of the Crystal Palace Act, a general rise in the price of gas shares had been going on. In the case of the South Metropolitan Company, whenever there was a sale by tender, a circular went to every one of their 80,000 consumers. In all the cases—except the Bristol one—which were agreed, the matter of conversion was discussed between the local authority and the gas company.

Mr. BALFOUR BROWNE: And practically the opposition was withdrawn, because the local authorities were satisfied?

Witness: They said so.

The CHAIRMAN: You have stated that you propose to continue to issue new stock to the consumers?

Witness: In the first instance. The first offer will be to the consumers at the market price. If they take up the stock, there is an end of it; but if they do not, it will be offered by sale or tender in the ordinary way. If the stock were not all taken up by consumers, we should go direct to auction, and not trouble about tenders.

Would not the effect of issuing this stock to consumers be, in the first instance, to make the market value of the stock a close market value?—I do not think it would be; but that is a very nice point.

Your consumers are only 80,000, which is a very small proportion of the community at large?—Yes.

Therefore, if you allow the consumers a preference, practically giving them the whole of the stock, and they take it up, you would make it a close body?—Yes; but the consumer is offered the stock at the market price. You cannot expect him to give more; and if he takes it at the market price, it will not have the effect of depressing the market value. It will raise it.

But the consumer knows that he has a monopoly. Take the case of some of the large consumers. If they know there is to be a fresh issue, they can "bear" the market in advance; and would not that reduce the value of stock, and give them a chance to come in at below the real value, just as the jobber did in the case when you say your stock was "beared" down to £230?—The large consumer is not likely to be the same sort of man as the large speculator. The stock to be sold could be limited. It is not worth the while of a man to "bear" the market in case he holds (say) £200. What we want to do is to get the best market price. If this system of offering the stock should not answer, we have always the option of falling back upon sale by tender.

Supposing this condition were granted to a small company whose total capital was £10,000, in the event of such a company having this clause 11, the stock would not be constantly in the market?—No.

Therefore, would there not be a chance of the stock being quoted below the legitimate value, simply because it was not offered to the public?—There is a possibility. But in answer to that, I say it is to the interest of the Directors always to get the highest possible price; and if they find the stock being quoted at much less than they consider the proper price, to delay the offer to the consumer until there is a reaction.

At present you offer to the consumer?—We offer first of all by tender. If the capital is not taken up by tender, we are then required to offer it to shareholders at the market price; but instead of doing that, although we have no authority for it, we, with the consent of the Board of Trade, offer it to the consumers.

Have you not the power which clause 11 would give you, with the addition that you are now obliged to offer to the public?—We do not like to act in accordance with the letter of the Act, and not the spirit. We could do it, and we have done it for the last five years; but it would be much more satisfactory if Parliament would sanction the arrangement, and let us do it in a straightforward way. I am satisfied that it will not injure the public.

A MEMBER OF THE COMMITTEE: You say you have not power to offer it to your consumers?

Witness: No; but Sir Henry Calcraft of the Board of Trade said that the department would raise no objection.

Mr. BALFOUR BROWNE remarked that they had to offer it to the shareholders; but in place of that, they offered it to the consumers, which, no doubt, was *ultra vires*, and could be stopped by injunction.

Witness went on to say that the South Metropolitan Company had 6000 to 7000 shareholders, 2700 of whom were consumers.

The CHAIRMAN asked what was the average amount of stock held by the consumers.

Witness said about £200 each, which meant really about £600 in money. Of course, the new stock was not likely to reach that premium. If there were a limitation to £500, it would be sufficient to discourage any tendency towards speculation.

Mr. BALFOUR BROWNE: But I understand your suggestion to be that, if stock is issued on the basis of a market price, there is a possibility of a conspiracy being entered into for the purpose of reducing the limit.

The CHAIRMAN: We have heard that a conspiracy of that sort was entered into in 1891, when the price for each £100 of stock was £230.

Mr. BALFOUR BROWNE: And I wanted to point out that the same thing would happen if we should offer the stock for sale by auction as before, because a reserve price must be fixed, and it must be based on the market price of the shares.

Mr. WORSLEY TAYLOR: Let us know why.

Mr. BALFOUR BROWNE said that had always been the case. He desired to inform the Committee that he had a number of other witnesses who could substantiate the evidence of Mr. Livesey. If the Committee should wish to have more information, he would call them, although he did not understand that his learned friends who were opposed to the measure questioned Mr. Livesey's evidence.

The CHAIRMAN said that such additional witnesses as Mr. Browne desired to call could be taken very shortly.

Mr. *Corbet Woodall*, M.Inst.C.E., said he had acted both for local authorities and for gas companies. Except in this instance, where conversion of stock had taken place, he had acted for the local authorities. There was small advantage to the shareholders by reason of the conversion of stock, and no disadvantage, but rather the contrary, to the consumers. Therefore he did not see any reason why the project should not be carried out. He held that view so strongly, that in the cases of Oxford, Plymouth, and Scarborough he advised the Corporations not to oppose the Companies' Bill for conversion; and they followed his advice. With regard to the offering of stock to the consumers, he thought it was a distinct advantage to have a considerable number of users of gas as stockholders. He admitted that, if offered by auction, there was a chance that stock might be bought up by speculators; but he did not think there was very much in that. He distinctly approved of the scheme to offer stock to the employees. He was satisfied that the Bill was not to the disadvantage of the public, and was sure the conversion of stock would be of advantage to all.

The CHAIRMAN: You are aware that there has been no sale of stock under the auction clauses since 1891. Do you think there is the same objection to offering the stock by tender?

Witness: I have heard the evidence of Mr. Livesey as to what took place when stock was offered on the market; but I scarcely conceive there would be any deliberate attempt to interfere with the price.

In further examination, witness said he considered it was a wise thing that consumers should have the first opportunity of taking up stock. If there were any question of bringing down the price of gas by selling the shares by auction, he, of course, would advise that this system should continue to be pursued; but no point of the kind arose. The fact that the offer of stock was limited to the 80,000 consumers of the Company would not depreciate its value. On the contrary, if it were known that the stock was largely held by consumers, it would tend to improve its value in the market.

Mr. *E. H. Stevenson*, M.Inst.C.E., said he had heard the evidence of Mr. Livesey and Mr. Woodall, and agreed with what they had said, particularly with regard to the proposed changes in the auction clauses. Where consumers of gas were also shareholders, there was a tendency to heighten the price of stock; not that he believed the stock of this Company would go higher because of the change, seeing the figure at which it at present stood.

By the COMMITTEE: He took the view that the sale of stock to consumers would tend to the general advantage.

This closed the case for the promoters.

Mr. WORSLEY TAYLOR then addressed the Committee on behalf of the London County Council. He said he need not take up time by disclaiming the slightest feeling of hostility against the Company. The Council looked upon them as doing a work that was useful to the public; and he was sure that neither the Council as a whole nor any individual member desired to stand in the way of the fulfilment of the legitimate desires of the Company, so long as they were carried out with due regard to the public interest. The Council believed, however, that this Bill raised a question of grave public policy, and a very far-reaching one; and it was for this reason that he was there, with his friend Mr. Kemp, for the purpose of assisting the Committee to come to a right decision. He was not there last year, nor was he there this year, with any idea of obtaining a triumph over the Company; but he wished to put before the Committee, as fairly and as temperately as he could, the facts from the point of view of his clients. Clearly, the London County Council, being the constituted guardians of the community, clearly had a right to have their views placed before the Committee. Now as to the features of the Bill. Mr. Livesey agreed that it was, in principle, the same as that which was presented last year. There was a difference of detail, but only in a minute way. Last year it was intended that the stock should be doubled; now, that it should be multiplied two-and-a-half times. He should, however, deal with the Bill as being the same as that of last year. He would first call the attention of the Committee to the fact that the promoters of the Bill were not able to allege any new circumstances which did not affect their measure of last year. Mr. Livesey was asked if there was any change; and he replied that there was not. Consequently, they had before them the same Bill as that which was discussed last year, and against which the Committee of that year gave its decision. The Committee rejected the Bill because they considered the subject to be one of such great importance that it ought to be brought before the notice of a specially appointed Committee; and although the present Committee could, of course, act independently of previous Committees, the issue was the same. He took the broad ground now that he did last year; founding his objection to the Bill on the basis that it would entirely alter the legislation of 1876. With regard to the effect of that legislation, Mr. Livesey and himself were quite at one. He (the learned Counsel) put it to Mr. Livesey that the legislation of that year was very carefully considered; and from what had been said, the Committee would know that every possible assistance was at that time rendered to Parliament, so that they might come to a right conclusion. The Metropolitan Board of Works and all the other interests were represented. Every point was most carefully gone into; and the decision arrived at was in the next year applied to the whole of the Metropolitan Gas Companies. Altogether, he was justified in saying that there was no piece of legislation on the statute-book which had been the subject of closer inquiry than the Act of 1876. The South Metropolitan Gas Company had for twenty years conducted their proceedings upon the basis of the 1876 legislation. The public also had accepted the same basis; and no attempt had been made to attack the distinct parliamentary bargain of that time. It certainly was a parliamentary bargain; and it proceeded upon the principle of giving something to each of the parties. There were advantages conceded to the Companies and to the public alike. Since 1876, owing to the legislation of that time, the Company had been earning higher dividends, and the public had received their advantage in the shape of a reduction in the price of gas. The holders of the £15,000,000 of gas capital in the Metropolis affected by the Act of 1876 were satisfied with it, with the single exception of the South Metropolitan Company. That seemed to him to be a very strong point. There was a bargain made between a number of parties; and now this Company, which agreed to the bargain, were seeking to be relieved from their obligations. As to the reasons which had been adduced for the introduction of the present Bill—the admission of consumers and employees as shareholders, and so on—it was affectation to pretend that a Company of this kind presented themselves to Parliament for any purpose outside their own interests. What was being attempted was the revision of a parliamentary bargain; and his contention was that there should not be any such revision until after very careful consideration of the interests of the public. If the legislation of 1876 was to be revised as to the whole of the gas capital of the Metropolis, supposing that the Companies gained anything, the public were also entitled to gain in view of the bargain of that year. This principle had been discussed in the case of the Water Companies; and it was capable of being discussed in this instance as well. For example, there might be revision as to illuminating power, price, and purity, or there might be some condition as to the provision of a sinking fund. He was not obliged to point out any particular matter. All he had to do was to submit that, where a bargain was to be revised, it must not be done by the action of one side alone. This Bill radically altered the legislation of 1876; and if the Committee adopted it, they would be revising a bargain at the instance of a mere fraction of the parties who consented to it. If this Company were to succeed in altering the law, they ought at all events to be able to make out a special case, and to state their reasons; and it appeared to him that, in a case of this sort, where legislation had been so thoroughly well considered, there ought to be very strong reasons indeed forthcoming for the revision of the parliamentary bargain to which he had alluded. Parliament, indeed, had laid down the lines upon which the procedure of gas companies should be conducted; and he submitted that from those lines there ought not in this case to be any departure. Last year he referred the Committee, as he would do again now, to the Standing Order which governed this matter of additional capital. He did not say the Order applied technically; but he did say that it clearly applied in spirit. The presumption was that the provisions of 1876 should apply until Parliament found to the contrary; and Parliament was not to find to the contrary unless the promoters of a Bill of this sort were in a position to develop and elaborate the specific reasons that should induce a Committee of the House to depart from a rule which Parliament had laid down as the ordinary one to be followed. These reasons, he submitted, were not to be general ones applicable to the whole of the gas capital with which the Standing Order was concerned, but there must be special reasons; and if this were not so, the only thing the Committee could do was to say they thought the whole legislation of the year 1876 ought to be swept away. If his view was the right one, he would ask what special and adequate reasons there were in this case for altering legislation. His learned friend Mr. Pope had told the Committee that this was entirely a domestic matter. A proposal which swept away the whole of the legislation of 1876 was hardly a domestic matter in his opinion. Touching the statement that converted stock could be more readily dealt in, the fact was well known that the stock of the South Metropolitan Gas Company was dealt in every day; and it certainly did not lie in the mouth of the Company to say that the purchasers did not know the conditions under which it was bought and sold. What the Committee were asked to do would simply raise the value of stock at present held, and enable the proprietors to put it on the market at an enhanced value. The Committee saw the use that had been made of precedents in this case. It had been said that this legislation should be sanctioned because this had been done in a number of other cases. He was also asking the Committee to follow a precedent. What use would be made of this precedent, supposing the Bill should be sanctioned. There was no instance which in magnitude compared with this one; and there was only one case—that of Bristol—which was settled in favour of the Gas Company. In all the other cases, there was agreement between the local authorities and the companies. This was a Stock Exchange question more than anything else; and, in reality, it only affected investors. At all events, he put it with great respect that the issue involved and the magnitude of the transaction were so large, that the matter was not one that should be adjudicated upon by an ordinary Private Bill Committee. With the suggestion that the employees of the Company should be admitted as shareholders, he was sure that every member of the County Council sympathized entirely and absolutely. The only question was whether the Committee ought to tamper with past legislation in order to carry out that object. There were methods by which that result could be attained without such large proposals for altering the law as were now submitted to the Committee. Finally, he would point out to the Committee that, if they passed the measure as it stood, they would be altogether repealing the auction clauses of the Act of 1876.

The room was then cleared, to allow the Committee to consider their decision. On the public being re-admitted,

The CHAIRMAN said: The Committee are of opinion that the preamble of the Bill is proved, subject to certain modifications. One of these is the exclusion of clause 11—that is to say, the Committee are of opinion that the old auction clauses are quite sufficient. Then in regard to clause 21, sub-section 6, we say that the amount of stock to be held by the employee-director should not be less than £250, which is equivalent to £100 of the present stock. The present stock is to be multiplied by $2\frac{1}{2}$; and so that will amount to £250. Further, the employee-director must have been in the service of the Company for not less than seven years. We look upon that as an important clause. Also that he shall have held the stock for not less than twelve months prior to his appointment.

Mr. BALFOUR BROWNE (after consultation with Mr. Livesey) said he could not ask the Committee to alter their decision; but he would be glad if they would permit him to put one or two questions to Mr. Livesey as to their ruling on the employee-director clause. There was evidently some misunderstanding; and he had thought this matter was to be left over. The sum of £80 was set down, because it was thought the converted stock would have a value of £100. Their object was that the workman-director should hold not less than £80 stock of nominal value.

The CHAIRMAN: The Committee are not inclined to alter their decision.

Mr. *Livesey* remarked that the arrangement was a tentative one, and could be altered by the Board of Trade.

The CHAIRMAN: The Committee see no reason whatever for altering their decision.

Thursday, April 23.

On consideration of the clauses of the Bill to-day,

Mr. BALFOUR BROWNE said: You will remember, Sir, the decision which the Committee gave—"This Committee are of opinion that the preamble is proved, subject to certain modifications." One is the exclusion of clause 11. That, of course, is very readily done because the clause, I suppose, is struck out.

Mr. COATES: Yes.

Mr. BALFOUR BROWNE: Then it goes on, "that is, that the Committee are of opinion that the old auction clauses are quite sufficient in this case." Of course, we have followed that part of your decision *in toto*. I may say, I hope we shall probably go on as we have been doing in the past; but that is not for you to know. Then the decision proceeds: "Then they suggest that in clause 21, sub-section 6, the amount of stock to be held by the employee, in case he is appointed a

director, should be not less than £250 of the new ordinary stock." Now, down below that you say: "The present stock is to be multiplied by 2½, so that that would make it £250 of the ordinary stock. Of course, they expect that you will include the words that he shall have been, as it is stated in the Bill, in the service of the Company for not less than seven years." Now, this is the part of the Bill to which I wish to call your special attention: "And the Committee look upon that as a very important part of the clause, and also that he should have held stock for not less than twelve months prior to his appointment."

The CHAIRMAN: I think that clause was in the original Bill.

Mr. BALFOUR BROWNE: I think it was. But there is a doubt in our minds with regard to what it means; and I will tell you what it is. Supposing a man had held stock in the Company—we will say £20 worth of stock—for the last five or six years; and he had just obtained his qualification before election, that apparently would carry out your view?

The CHAIRMAN: No; our intention clearly was that he was to hold £250 of stock for twelve months.

Mr. BALFOUR BROWNE: I think that would be the intention of the promoters also.

The CHAIRMAN: We simply altered the clause making the £80 into £250.

Mr. BALFOUR BROWNE: Then, Sir, may I point out this: One of the disadvantages of putting the qualification so high will be that the choice may be limited perhaps to one or two men. There are so few that would have such an amount of stock, and practically, if there were only one, there would be no choice at all. Although I do not like to ask you about it again, we want it to be as elastic as possible.

A MEMBER OF THE COMMITTEE: I think that can be arranged.

Mr. BALFOUR BROWNE: I quite agree; and the way it could be arranged would be this—that a certain amount of stock could be transferred to the particular man that was desirable to be selected. But then I think it would be open to very serious misconstruction.

A MEMBER OF THE COMMITTEE: But that is done constantly.

Mr. BALFOUR BROWNE: But would it not be open to the misconstruction that the Directors were "packing" the directorate? I know it can be done as you suggest. For instance, if the workmen chose to transfer a certain amount of stock, it could be done in that way, but then he would be a delegate of the men, and their catspaw upon the directorate. On the other hand, we want to get on the directorate a thrifty man who had himself saved a certain amount.

The CHAIRMAN: I do not think the Committee are inclined to alter their decision.

Mr. BALFOUR BROWNE: Very well, Sir, I have done my best. The remaining matters can, I think, be dealt with by the Agent in going through the clauses.

The clauses were then considered and agreed to; and the Chairman was directed to report the Bill, as amended, to the House.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—OFFICIAL REFEREES' COURT.

Plymouth—Thursday, April 23.

(*Before Mr.* E. RIDLEY, Q.C.)

The Claim against the Plymouth and Stonehouse Gas Company.

To-day the above-named Official Referee opened an inquiry with the object of assessing damages in an action brought against the Plymouth and Stonehouse Gas Company by Mr. W. O. Ward, the owner of a tannery at Coxside, Plymouth, adjoining the Company's works. An injunction was agreed to by the Company (*ante*, p. 521) and the scope of the present investigation was limited to an assessment of damages.

The statement of claim alleged that defendants had negligently managed their works, and had omitted to take reasonable precautions to avoid damage and annoyance to the plaintiff and his workpeople, and to his works and business, tan liquor, and stock-in-trade, by having wrongfully caused and permitted noxious smoke and other vapours, smuts, and black dust and other injurious matter to escape from the works, spreading and distributing themselves, and settling over and upon the lands and buildings of the plaintiff. It was alleged that the nuisance arose when the retorts were working or the Company were crushing coal or coke, especially when the wind was blowing from a particular quarter, and that the retorts were charged by a process which created an unnecessarily large amount of dust and smoke. It was further alleged that the negligence complained of had occurred continuously between Oct. 1, 1894, and the present time. Defendants, in their answer, denied having negligently managed their works, and having omitted to take reasonable precautions, or permitted noxious matter to escape; and they submitted that the depreciation in value alleged was not due to any act or omission of theirs. The things alleged, if they had been done at all (which they did not admit), were done in pursuance of statutory powers vested in them by Act of Parliament. They further contended that, with the knowledge, acquiescence, and concurrence of the plaintiff, they purchased the lands adjoining his works; and that nothing had been done upon the lands which was not contemplated by the plaintiff and themselves at the time of the purchase. On these grounds, it was submitted that plaintiff had no equitable claim.

Mr. GRAHAM, Q.C., appeared for the plaintiff; Mr. CHANNELL, Q.C., and Mr. DUKE for the defendants.

Mr. GRAHAM explained the system of tanning, and said that in drying the hides it was of the greatest importance that the process should be conducted slowly and naturally for about a month. During this period, the hides were rolled by a powerful machine, and were oiled; and it was absolutely necessary to keep them in that state clear of smuts. They were rolled on a metal table, which had to be always perfectly clean. The nuisance complained of had at times been so great that the men were obliged to stop and brush as fast as they could; but no sooner had they recommenced rolling, than they had to stop again from the same cause. The first item in the plaintiff's claim was the actual cost of all this brushing and cleaning. The damage began in October, 1894; and the claim would have been a good deal more serious than it was but for the fact that, at the end of April, 1895, there was a most exceptional "boom" in the leather trade, and Mr. Ward, whose business had gradually been getting smaller, was enabled practically to clear off the whole of his accumulated stock. This prosperous time came to an end in September last; and since then his stock had accumulated very greatly. The second head of damages referred to the leather which had been properly prepared and hung in the drying-lofts, where it was contaminated by smuts and iron and coal dust. Injury had also been done by discoloration of the valonia or tan liquor; and in consequence of this the plaintiff had had to reduce the dipping of hides.

The Official Referee, accompanied by Counsel and witnesses, visited the tannery and gas-works, and evidence was then proceeded with.

Mr. *Ward* stated that his business had been carried on, first by his father and subsequently by himself, since 1865. In 1894, he erected the present works, which covered 2½ acres of land, and were capable of turning out 400 hides a week. There was no nuisance to complain of from the gas-works until October, 1894, when the Company built a new retort-house. Within a few days of the house being worked, he found soot and smoke coming into his place; and he complained to the Company of the great damage which was being done. The Directors and other persons visited his works frequently.

The REFEREE: Do you admit that the Company did their best to mitigate the nuisance?

Witness said they had, since the injunction, but not previously. Although they had gone to considerable expense, the nuisance from smoke, dust, and dirt was even more troublesome than before. The winter of 1895 was worse than that of 1894. When the plant and machinery were in full working order, the nuisance was much greater than when they were working at two-thirds the capacity, as at present. For some time past, the whole of the gas had been manufactured in the new retort-house; and in consequence of this his business suffered more than previously. Plaintiff went on to describe the processes of tanning, and to emphasize the necessity of cleanliness; and he pointed out that additional labour was entailed by the presence of dust and smuts. All his present stock was, he said, more or less damaged; and experts had advised him to discontinue tanning. This to a large extent he had done. If the liquor now in the pits had not been damaged, he should have estimated its value at £3000. If the nuisance continued, it would be impossible for him to carry on the business.

Friday, April 24.

The proceedings were resumed to-day, when some further witnesses were called.

Dr. *A. Wynter Blythe*, the Medical Officer of Health and Public Analyst for Marylebone, gave evidence as to the result of his examination of dust which had collected in the leather loft of the plaintiff's tannery, and in the tan liquors. In each case he found a considerable proportion of iron, coke, and mineral matter prejudicial to the quality of the leather. In the dust taken from the floor of the loft, there was 9 per cent. of iron; and in that gathered from the butts of leather there was 4 per cent.

Plaintiff was recalled, and was cross-examined at length by Mr. CHANNELL as to the financial transactions of his business and his comparative expenditure on wages, hides, and tannery materials for several years past. He was also cross-examined as to the increased labour involved in the tannery operations owing to the deposition of soot and dust from the gas-works, and the additional cost thereby entailed.

Mr. *H. R. Procter*, Professor of Chemistry (with special reference to the leather industries) at the Yorkshire College, Leeds, gave further evidence as to the presence of iron and other mineral substances in the dust and tan liquor obtained from plaintiff's works; and he submitted solutions of tanning liquor, showing the deleterious effect of a very small quantity of iron in darkening the tint, and so damaging the colour of the leather.

Saturday, April 25.

When the case was resumed to-day, a consultation took place, with the result that the Company consented to a verdict for the plaintiff for £3500.

The Water Supply of Stratton and Bude.—The question of the water supply for Stratton and Bude was under consideration at a recent meeting of the Stratton District Council. A scheme for constructing works on Wrasford Moor, and bringing in water at an estimated cost of £7000, had been submitted by Mr. Anson; and provisional agreements with the tenants of the land were arrived at. A letter was, however, read from Mr. G. Brandon, who represents the district on the Devon County Council, urging the adoption of another scheme which could be more quickly carried out, and which he contended would ensure for Bude an immediate and abundant supply. The source of this supply is an artesian well near the town. Mr. Brandon stated that, as the result of continuous pumping for ten hours, the water in the well, which is only 16 feet deep, was exhausted; but there was a constant supply at the rate of 8 gallons per minute from a 3-inch pipe, which is sunk to a depth of 90 feet. By means of a syphon, the whole of Bude could, he contended, be supplied from this source. Mr. Anson, in answer to questions, admitted that a supply of drinking water might be drawn from this source; but the bigger scheme was necessary to provide for the growth of Bude. Pipes could be laid in readiness for the larger supply, and the wells used temporarily. It was decided to apply to the Local Government Board for sanction to a loan to proceed with the smaller scheme. By a majority of one, words intimating that the main scheme would stand over were omitted from the resolution.

MISCELLANEOUS NEWS.

BUENOS AYRES (NEW) GAS COMPANY, LIMITED.

The Annual General Meeting of this Company was held last Tuesday, at the London Offices, 1, East India Avenue—Sir WILFORD BRETT, K.C.M.G., in the chair.

The SECRETARY (Mr. E. W. Layton) having read the notice convening the meeting,

The CHAIRMAN moved the adoption of the report and accounts. In doing so, he said the latter showed that the profit for the year was £45,461, to which had to be added the balance from 1894 of £3282—making a total of £48,743. From this had to be taken the debenture interest £12,000, and a further sum of £8210 had been carried to the reserve fund; leaving £28,532 to be dealt with. Of this amount, £10,000 had already been paid to the shareholders as an interim dividend; and the Directors recommended that a final dividend of 6s. per share be declared—thus making a dividend of 5 per cent., free of income-tax, for the year, or an advance of 1 per cent. upon that for 1894. This improved result was due in part to the appreciation in the value of the paper dollar during the year; and he was happy to say that the premium had gone down again that day. The continuation of the low prices of coal and freights, and the economy effected by the adoption of Young's oil-gas plant, had also aided in producing the improvement. Negotiations with the Municipal authorities for a new contract for the public lighting were still in progress; the service in the meantime being continued by the Company. On the expiry of the contract on the 1st of May last, the Municipality invited the four Gas Companies established in Buenos Ayres to tender for the public lighting; but the conditions laid down were of that character that none of the Companies felt disposed to respond. The invitation was repeated a few months afterwards, with modified terms; but still they were too stringent to induce any of the Companies to again tender. The matter was still in abeyance, as the Municipality were evidently considering what further terms they would put forward that might be acceptable to the Companies. While on this subject, perhaps he might mention that the number of public lamps had increased by 583; and at the end of the year, they had 7482 in use. This service of public lighting boasted a length of 1755 squares, or 135 miles of streets; and he thought it would be gratifying to the shareholders to know that, during the whole of the year, there had been no serious complaint by the Municipality, or from any direction, against the Company. They had also had a fair increase in the private consumers—to the extent of 5 per cent.; and although the average amount of the gas bills sent out was higher, the volume of the gas consumed per burner was lower. This decrease in the consumption of each individual was to be accounted for partly by the superior quality of the gas which had been supplied, and which had necessitated the use of fewer burners. It had also been partially due to the progress made by the electric light during November and December, which were really the summer months in Buenos Ayres. It should be borne in mind that this progress in the electric light had not made itself felt in the number of the gas consumers, because the meters were still all connected; but it did make a difference in the amount consumed per meter. It was already apparent that the use of the electric light would vary month by month, according to the season—first of all, because of its high cost; and secondly, because of the high illuminating power of the gas now supplied, by which a Bray's No. 4 burner was nearly equal in power to the incandescent lamps usually supplied to the private houses. The Chairman went on to refer to the discussion that has been proceeding at home with reference to the supply of gas of high illuminating power; and, continuing, he said that the management had been making great efforts to reduce the amount of unaccounted-for gas. Their mains had been gradually overhauled and examined; and he was happy to inform the shareholders that the result was there had been a decrease of 2·22 per cent. in the unaccounted-for gas, which, of course, was a considerable advantage. Their mains had been extended during the year by 25,780 lineal feet—partly at the request of the Municipality for additional public lamps; but still the new mains were in localities and in squares where new houses were likely to be erected. The general condition of their extensive network of mains was certainly satisfactory, as was shown by the decrease in the unaccounted-for gas. In the course of the year, there had been 1168 new service-pipes connected for private consumers. With regard to the residuals, the sale of tar had been well maintained; and it showed an increase of 30 per cent. There had been a decrease in the receipts for coke and breeze, partly because the coal merchants in the Boca had been selling their coal breeze at a very low price indeed, and partly because the Company had adopted oil gas, in the manufacture of which they used a larger quantity of coke. Taken altogether, the general working results during the year had been satisfactory; and he thought he might fairly congratulate the shareholders on the favourable outcome of the year's operations. Their local staff had been working well; and they showed that their hearts were set upon promoting in every way the interests of the Company. Turning to the accounts, he explained that the old renewal fund of £27,778, which appeared in the accounts of 1894, had been applied to the reduction of the assets standing under the head of service-pipes, &c.; and it would now be found on the credit side of the accounts. In view of the expiration of the Municipal contract, the Auditors had deemed it advisable to apply £10,736 of the fund to extinguishing the asset of service-pipes for public lamps (as these, under the terms of the contract, became the property of the Municipality), and to apply the balance of the fund—about £17,000—in writing down the book value of the private services. The Auditors were quite right, because, as a matter of fact, the contract terminated on May 1 last year; and therefore the Company could no longer keep as an asset on the other side the cost of the public lamp services. Of course, if they obtained the contract for the public lighting again, they would have the use of the services. He also reported that, in the item of salaries and management, there had been a reduction of 50 per cent. This had arisen from the re-arrangements the Directors made in the staff last year, and which had worked satisfactorily. The expenditure for repairs and maintenance had also been less; and the cost of distribution had been reduced by 1d. per 1000 cubic feet. This was gratifying in view of the fact that the number of services had been increased. If gold did not go up, there was no reason why the current year should not be better than last year; and if gold went down, he need hardly say that they would then have a very satisfactory account. This was the 21st year in which he had had the privilege of addressing the shareholders; and it was a great satisfaction to him that, on this occasion, he was able to give them such a favourable account.

Mr. F. J. HESELTINE seconded the motion.

Mr. S. SPENCER said he noticed that under sundry debtors they had £24,252 entered against the Municipality, as compared with £9114 last year; and as this seemed such an extraordinary advance, he should like some explanation of it. He also observed, with reference to the oil-gas plant, that 50 per cent. had been written off. This seemed rather a large amount to write off in two years; and he thought it should have been spread over a longer period.

The CHAIRMAN replied that the Company were, of course, very much dependent upon the payments made by the Municipality. Sometimes they were enabled to pay the Company more liberally and quicker than at other times. It was true they had fallen back in their payments; but the shareholders might rely upon it that the sum was a good asset. The oil-gas plant had been working very satisfactorily; and they were proposing to add to it this year. Replying to a question, also by Mr. Spencer, as to the private lighting, he added that it would not be wise to raise the price at present, as there was so much competition.

Mr. SIMMELKJÖR, referring to the amount written off the cost of the oil-gas plant, said it was really his proposal that this course should be taken, because he did not consider the plant was really chargeable to capital account. They had not by its adoption increased the capacity of the works; and he should have liked to have seen the whole put down to wear and tear. Instead of repairing or replacing the old coal retorts, they had erected the oil-gas plant.

Mr. SPENCER: We are not in a position to write off 50 per cent. in that way at the present time.

Mr. SIMMELKJÖR: I consider it good, sound practice.

Mr. SPENCER: Certainly if you have the money to do it with.

Mr. OGILVIE, alluding to the Chairman's statement that the contract for public lighting ended in May last, asked whether it was not a fact that the Municipality became indebted to the Company at a greater ratio after then than at the beginning of the year.

The CHAIRMAN said that might be so; but the money owing was a good asset.

The SECRETARY added that the Municipality were now paying daily.

Mr. OGILVIE suggested that the various Gas Companies in Buenos Ayres should work together to obtain payment from the Municipality.

The motion was unanimously adopted.

The dividend recommended having been declared,

The retiring Directors (Messrs. F. J. Heseltine and R. J. Neild) and the Auditors (Messrs. Turquand, Youngs, and Co.) were re-elected.

The usual complimentary vote to the Chairman and Directors, the Local Committee, and the staff terminated the proceedings.

THE MANAGEMENT OF THE LONGTON CORPORATION GAS-WORKS.

Report by Mr. Thomas Newbigging.

The allegations made against the present management of the Longton Corporation Gas-Works by Mr. Dawson at the February meeting of the Council have not been justified; but, at the same time, it is likely that benefit will arise from the action which he then took. To ascertain the truth of his assertions, he suggested—and the suggestion was cordially accepted by the Chairman of the Gas Committee on behalf of himself and the Manager, Mr. W. W. Hulse—that an expert should be engaged to report upon the works and their management. The Engineer chosen was Mr. Thomas Newbigging, who, in accordance with his instructions, has since visited and inspected the works on two occasions, and has carefully considered all the circumstances of the management and working. His report, which is dated March 23, has since been issued to the members of the Council.

At the outset, Mr. Newbigging states that, with the important exception of the retort-house, the works are in excellent order; the machinery, apparatus, and plant generally, being of large capacity, and capable (providing the exceptional conditions are remedied) of affording an abundant supply of pure gas of good illuminating power. Notwithstanding the defects existing in the retort-house, the cost of working, as revealed in the accounts, is reasonably low. There can be no doubt that the carbonizing appliances and arrangements in the retort-house are extremely defective; and this state of things is aggravated by the class of coal that is being used for producing the gas. The use of coal slack for gas making is not seriously objectionable under proper conditions. Where a high and steady carbonizing temperature can be obtained, it is possible to use it, if not with advantage as compared with a better class of coal, at least so that the whole of the gas can be evolved from it. This high and steady temperature, however, is unattainable with direct coke firing, such as is employed at Longton. Although a larger and better class of coal would cost more per ton, it would not be less economical in the end, because of the increased make per mouthpiece, and the largely augmented yield per ton which would be obtained. The average yield of gas per ton during last year was only 8313 cubic feet; and the make per mouthpiece, about 4000 cubic feet. At Christmas last, 3 per cent. of cannel was added to assist the production and improve the quality of the gas; and this is being continued. The slack when thrown into the retorts is so closely compacted that, unless a very high temperature is maintained, the heat cannot permeate the mass sufficiently to admit of perfect distillation. The effect is that the drawn coke contains a proportion of gas which would otherwise go to increase the production. Neither is the coke improved in quality; because, unless all the volatile matter is drawn from it, it is loose and friable, and subject in handling to break and yield a large proportion of breeze. If, however, says Mr. Newbigging, the Council determine to adhere to

the use of slack, then it is necessary, if the best results are to be obtained, that regenerative firing should be adopted. But, indeed, under any circumstances, whether slack or a better class of coal be employed, regenerative firing is desirable; and he recommends it as securing economy all round, effecting a saving in labour, in fuel, and in wear and tear.

Dealing with the plant in the house, Mr. Newbigging describes the ironwork mountings of the retort-stack as being very far from satisfactory. The hydraulic main is particularly defective. It is supported directly upon the retort-stack, and is consequently liable to derangement in level by the expansion and contraction of the brickwork. In order to overcome the irregularity of seal upon the dip-pipes caused by this method of support, midfeathers or diaphragms of sheet iron have been inserted in the main at frequent intervals apart; the object of these being to maintain an even level of the liquid contents of the main. The effect of this expedient is that, instead of weak ammoniacal liquor, the sealing medium of the dip-pipes is exclusively tar. Not only so, but this tar, being effectually prevented by the diaphragms from flowing away and becoming replaced by a thinner liquid, is kept in the main permanently, and, being subjected to a distillation process by the heat of the retort-benches, it assumes a pitchy consistency, eventually hardening to such an extent as almost to choke the passage of the gas as it issues from the retorts—thus giving rise to the grievous evil of stopped ascension-pipes. Again, the valves at the end of the hydraulic main are only 8 inches in diameter, although they lead into a 12-inch foul main. Further, it would appear that, until recently, the 12-inch mains conveying the gas from the hydraulic main were so arranged along each side of the retort-house, as always to contain within them a reservoir of tar to the depth of about 6 inches. In this way, the area of the passage for the gas, sufficiently contracted even if the pipes had been clear of obstruction, was reduced by one-half. The further effect (besides causing choked ascension-pipes) of these most objectionable features is to impair the illuminating power of the gas by its passage over and through the thick tar, and, by causing an undue back pressure, to produce a rapid and constantly-growing deposit of carbon—the richest constituent of the gas—upon the inside of the retorts. This again affects the retort temperature, entails a waste of fuel, reduces the gas production and the illuminating power, and in its removal by chisel bars damages and cracks the retorts. The Manager, it is stated, wisely determined to clear the foul mains by altering their level, and so allowing the tar to flow freely away into the underground well. The consequence of this right action could scarcely have been foreseen. The draining away of the tar from the foul mains reduced the level of the liquid in the hydraulic (which was thus proved to have been above the level of the diaphragms, or some of them), and unsealed certain of the dips, with the result that, in drawing the retorts, the gas backed down the ascension-pipes. When this was found to be the case, the Manager restored the seal on the dip-pipes in the only way possible under the circumstances, by raising the end diaphragms in the hydraulic mains. The whole conditions are so bad that Mr. Newbigging has no hesitation in saying that had anyone gone with the pre-determination to make the work of carbonization as unsatisfactory as possible, they could not have succeeded better than by adopting the absurd arrangements he endeavours to describe. The Manager, however, is not to blame for this state of things. The arrangements have come to him as a legacy from those who contrived them; and he has had to struggle on and produce the gas as best he might. The difficulties were not as great in previous years as they proved to be last winter, because Mr. Newbigging understands that the raw material formerly used for gas making was better in quality, and fewer retorts were employed. But, with an inferior material, and the whole of the retorts in action during the past heavy lighting season, the defects in the plant had every chance of revealing themselves and working mischief.

The remedy given by Mr. Newbigging is to raise the hydraulic main about 30 inches, or 3 feet above the benches, and to place it on supports entirely apart from the brickwork by providing longer buckstaves, and bracing them together by means of cross girders, on which the hydraulic main would rest. The main should also be divided into separate lengths—one for each oven—and subsidiary mains to convey away the gas and the liquid products should be provided. New and longer ascension-pipes would also be required. The benches, as they now exist, however, are in such a condition as not to warrant the outlay which these alterations would entail. They are dilapidated and generally defective. In Mr. Newbigging's opinion, the proper thing to do, therefore, is to take them down, and re-build them entirely on the best principle, supplying such new iron mountings as are necessary. In order to apply the regenerative system of heating, an underground passage round the retort-stack would have to be formed. The floor of this would be 8 feet below the charging-floor. He understands, however, that there is water in the ground at a depth of 3½ or 4 feet from the surface, and that there is no possibility, except by continuous pumping, of draining this away. Such being the case, the regenerative system could only be applied by raising the present retort-house floor a height of 4 feet at least. This would entail great expense and inconvenience, because the house, as built, is scarcely adapted for it; and the roof might have to be raised bodily.

Giving weight to all these considerations, what Mr. Newbigging recommends is that a new retort-house be erected at the end of the present one, on the land now used for the storage of coke. It would contain six through ovens or benches, with 16 mouthpieces to each through bench, or 96 mouthpieces altogether, and the retorts Ω-shaped. There would be one dwarf chimney in the centre. Regenerative firing would be applied; and the whole of the mountings would be constructed and arranged on the best principle, so as to ensure economy and efficiency in working. His estimate of the cost of such a house, arranged as described, is £7000; and it could be ready in good time for the winter of 1897-8. When the new house was completed, the Council could then turn their attention to the existing one, and remodel it in such a manner as might be determined.

Regarding the purifiers, Mr. Newbigging says these are of ample size, and capable of dealing with 35 per cent. more gas than the present maximum make. With reference to an accident which occurred to the purifiers last winter, by which certain of the side plates were fractured, he says that the metal of these plates is not as thick as it ought to be for the size of the vessels. The primary cause of the accident, however, was the swelling of the artificial oxide, which, being new, was in an active condition for taking up the impurities. Mr. Newbigging has seen a precisely similar accident at another gas-works; and he remarks that Mr. Hulse adopted the proper course in mixing a proportion of sawdust with the oxide, to reduce its activity and prevent expansion. To entirely obviate such an occurrence in the future, moveable tie-rods of 1-inch round iron should be applied to the sides of each vessel at the upper edge of the water-lutes, two longitudinally and two transversely. These would be removed on discharging the purifiers, and replaced when the fresh oxide was put in. The proper method of using the oxide is to place it in two thick layers in each vessel. If lime is used, this is best in four layers of 5 inches to 6 inches in depth.

As to storage, Mr. Newbigging reports that the capacity of the two gasholders is also very ample. On this the Council are to be congratulated, because it minimized the risk of running short of gas during the winter by reason of the difficulties encountered in the retort-house. The condensing apparatus is equally capacious and effective. The tower scrubber is doing good work; but he recommends that it be supplemented by a rotary washer-scrubber. By the adoption of this machine, the recovery of the whole of the ammonia from the crude gas before it reached the purifiers would be ensured; and the production of sulphate of ammonia would be increased. The cost of this apparatus, including the foundation, would be about £600. The station meter is just barely large enough for the maximum day's production; and a larger meter will shortly have to be provided.

The unaccounted-for gas last year is stated to have been 7·95 per cent. of the make. This, under ordinary conditions, would be considered rather high; but it is not excessive for a mining district like Longton, where considerable subsidence of the ground is constantly taking place in portions of it. At the same time Mr. Newbigging is of opinion that by a more vigilant supervision of the mains, service-pipes, and public lamps, the percentage of loss might be reduced.

There is one further point to which, in conclusion, Mr. Newbigging considers it his duty to call attention. What with the secretarial and managerial duties, the Manager has, in his judgment, too much to do. If he had such necessary assistance as would relieve him of the actual clerical work of the office, or the bulk of it, he would be in a position to devote his time more largely than now to the work of gas manufacture and distribution. Mr. Newbigging does not know what Mr. Hulse's views may be in regard to this, as he has not had any conversation with him on the subject, having come to this conclusion from observation alone; but he is satisfied that the work of both departments is greater than one man can well perform. In the course of his investigations, Mr. Newbigging has found Mr. Hulse thoroughly well posted up in all matters pertaining to the department; and he is of opinion that he is a competent Manager.

CHESTERFIELD GAS AND WATER COMPANY.

The Allocation of the Purchase-Money.

A Special Meeting of the Chesterfield Gas and Water Company was held last Tuesday, for the purpose of considering the best method of allocating the £231,836 paid by the Chesterfield Gas and Water Board, under the recent award (see *ante*, p. 645), for the property of the Company. Mr. R. T. GRATTON (Chairman of the Company) presided.

The scheme proposed by the Directors was as follows: "(1) To pay off and return the calls paid in advance on the last issue of shares, amounting to £1478. (2) Preference shares amount to £41,200, and the guaranteed stock to £8000, together £49,000, and were entitled to a preferential dividend of 5 per cent. per annum. It is proposed to pay to the holders of such preference shares and guaranteed stock the sum of £12 10s. for each £10 of shares or stock, and so, in proportion, for any less sum than £10, in full settlement of their claims on capital account. This will absorb £61,500. (3) The ordinary stock of the Company amounts to £11,200; and the holders were entitled to dividends up to 10 per cent. per annum, if earned, and to payment of arrears of dividend out of the earnings of subsequent years. It is proposed to pay to the holders of that stock the sum of £14 for each £10 of stock, and so, in proportion, for any less sum than £10, in full settlement of their claims on capital account. This will absorb £15,680. (4) The ordinary shares, paid up and partly paid up, amount to £120,206, and were entitled to a dividend up to 7 per cent. per annum. It is proposed to pay to the holders of the ordinary shares the sum of £12 for each £10 fully paid-up share, and so, in proportion, for any share upon which less than £10 has been paid up. This will absorb £144,246." The balance of the purchase-money, amounting to £8932, and any balance of capital funds, after payment of all debts, costs, and liabilities payable by the Company out of capital, and the winding up of the concern, it was proposed to divide among the ordinary shareholders only, in proportion to the amounts paid up on their shares, or as they might direct. This £8932 made the total £231,836.

Mr. STANTON (one of the Company's Solicitors) having read the notice convening the meeting,

The CHAIRMAN delivered a long address, in which he reviewed the circumstances which had led to the acquisition of the Company's undertaking by the Chesterfield Gas and Water Board, on terms which had been settled by arbitration. Referring to these, he remarked that Mr. Balfour Browne had given £750 per million cubic feet of gas as what might be called a standard price for an undertaking, in proportion to the quantity of gas made. At Chesterfield, the purchase price was £1887 per million feet. He hoped the shareholders would conclude that they had obtained a very fair price for the works they had to sell, having regard to their capabilities and productive power. With regard to the water undertaking, their commercial rather than their structural value was taken; and he believed this was the true test. Taking the net maintainable revenue, and multiplying it by a certain number of years' purchase, the result which came out was one with which he was satisfied. Even if it had been considerably less, he still should have been satisfied, because the purchasers had acquired what had cost him many an anxious hour—viz., the obligation

to furnish an additional supply of water. Considering it as a whole—looking at the gas and water works as one undertaking, which they really were—the shareholders would find, by the last balance-sheet, that the preference and guaranteed stock and ordinary capital of the Company amounted to £167,058. They were offered by the Board (it was a formal offer before going to arbitration, and not pursuant to the Lands Clauses Act) the sum of £211,500. The award was £231,836. The difference between the award and the capital—the amount subscribed by the shareholders—was £64,778, which was, in round figures, a profit of something like 38 per cent. This 38 per cent. above the capital value of the undertaking was not, to his mind, a price which should cause regret; and his colleagues on the Board were all substantially of the same opinion. The next question was as to how the money was to be divided. They had 350 separate holdings; and what he had to do was to get 350 people with distinct rights into the same way of thinking. If they did not agree, they could adjourn, and reconsider their views; or the proposal might be rejected, which could be done by a majority of one vote; or it might be submitted to arbitration. If they accepted the scheme, they might look forward to having their cash within a month; but if they rejected it, he could see nothing but delay and expense. His opinion was that there was no priority in respect of the capital. If their expectations were realized, the result would be this: The holders of preference capital would get £125 per cent., which meant that they would get their present dividend if they invested their money at 4 per cent.; the ordinary stockholders would receive £140 per cent. in full satisfaction; and the ordinary shareholders would get £120, with strong probability that they would get another £10 in addition, which would mean £130. When they considered the difficulties attending the winding up, the uncertainty that existed, and the novelty of the situation, he thought the result was one they ought all to accept. After paying the amounts mentioned, there would be a surplus of cash of an amount that he could not precisely define. But at the present time it amounted to over £6000 on the old account now standing to their credit at the bank, £8932 balance of the purchase-money, and a large sum of money due for gas and water supplied during the past quarter. There was a lot of liability as well; but he thought they would be able to pay the ordinary shareholders another 10 per cent., making their rate £130 per cent. For the last 10 per cent., however, they must expect to wait with patience for many months. He concluded by moving—"That the scheme relative to the distribution of the purchase-money, amounting to £231,836, received from the Chesterfield Gas and Water Board, and of any balance of the capital funds of the Company, be and the same is hereby approved."

The Deputy-Chairman (Mr. Burkitt) seconded the motion.

Mr. Creswick remarked that the Board's proposal was that the proprietors should receive £125 for £100, or 4 per cent.; and considering the position of gilt-edged securities, they could not get at the present time 4 per cent. if they invested therein £125, but would get much less. Therefore, on behalf of the preference and guaranteed shareholders, he was sorry to say he must object to the scheme. If any other means could be arrived at, before going to the arbitrator, to show him that he was wrong, he would be glad to consider his position. It was not his wish to put the shareholders to any cost; but at present he must follow the Act of Parliament, and object to the scheme and formally insist on the objection.

Mr. S. Smith, as an ordinary shareholder, said he had come there that day to oppose the scheme; but when he found there was a difference of only 2s. 6d. per share upon what he had considered necessary, he was quite prepared to accept what was proposed by the Directors. But as one shareholder objected, it was not worth while discussing the scheme.

Mr. E. Taylor: Will Mr. Creswick tell us why he objects to the scheme, and what would satisfy him?

Mr. Creswick: I object to the scheme on the grounds that the money you are paying for my preference shares I cannot invest to bring in the same amount of interest that I get at the present time. That is my objection.

Mr. Brown characterized the objection raised by Mr. Creswick as absurd and ridiculous.

The Chairman proceeded to answer various questions. Referring to Mr. Creswick's objection, he remarked that he was sure nothing he could say would do any good, because it was purely a legal matter. They must, therefore, postpone the matter until they went on with their arbitration.

The motion was then put *pro formâ*, and two proprietors voted against it. It was accordingly declared not carried.

Two other resolutions having been passed,

Mr. C. E. Jones suggested that Mr. Creswick might be induced to alter his opinion; and he thought it might give time for consideration if the meeting were adjourned to that day fortnight. He moved to this effect.

Mr. Creswick said he would consider the question simply from a legal point of view, and consult Counsel upon the matter; and if he saw the slightest prospect of not getting more than what was put in the scheme for preference shareholders, he would be glad to withdraw his opposition.

The motion for an adjournment was then put and carried; and the proceedings closed with a vote of thanks to the Chairman.

The Fatal Explosion at the Huddersfield Corporation Gas-Works.—Alfred Goodall, who was injured in the explosion at the Huddersfield Corporation Gas-Works on the 11th inst., died at the Huddersfield Infirmary last Wednesday from pneumonia, which had supervened on the injuries he received. This makes the second death in connection with the accident.

The Gas-Works Purchase Question at Driffield.—The Local Government Board have forwarded to the Driffield District Council a copy of the Provisional Order which they propose to issue enabling the Council to acquire the gas undertaking. The Order provides for the works being carried on on the present site, although, when the Inspector held an inquiry a short time ago, objection was made on the ground that the water supply in the neighbourhood might be contaminated.

SALES OF SHARES.

Mr. Alfred Richards conducted an important sale of gas and water shares at the Mart, Tokenhouse Yard, E.C., on Monday last week. Some 5 per cent. preference stock of the Hornsey Gas Company was sold at the rate of £142 10s. per £100 of stock; returning the investor £3 10s. 2d. per cent. A parcel of "B" stock, with a standard dividend of 7 per cent. per annum, fetched £197 per £100; yielding the purchaser £3 11s. 1d. per cent. Some "C" stock was knocked down at the rate of £182 per cent.; and "D" stock, at £197 per cent. "A" stock of the Wandsworth and Putney Gas Company was sold at the rate of £373 per £100; "C" stock, at £291; and "D" stock, at £290. Fully-paid £10 shares in the Uxbridge and Hillingdon Gas Company fetched £25 10s. each; the new ordinary shares, £18 5s. and £18 apiece. "A" stock of the Brighton and Hove General Gas Company, the last dividend on which was 8 per cent. per annum, was sold at the rate of £203 per cent. Four £10 fully-paid "A" preference shares in the Peterborough Gas Company were secured for £13 each; ten ordinary shares, for £25 5s. each; and new ordinary shares, for £17 5s. and £17 10s. each. "A" stock of the Barnet District Gas and Water Company, the last dividend on which was 9 per cent. per annum, was sold at the rate of £241 per cent.; returning the purchaser £3 14s. 8d. per cent.; some "C" stock, at £233 per cent., returning £3 17s.; and some "D" (water) stock, at £198 and £199, returning £3 3s. 3d. per cent. "A" stock of the Tottenham and Edmonton Gas Company fetched £293, £294, and £295 per £100; "B" stock, £215; and "C" stock, £217—returning to the purchaser £3 18s., £3 19s. 1d., and £3 18s. 4d. per cent. respectively. Shares in the Great Yarmouth Gas Company realized the following prices: £30 shares, earning 8¼ per cent. per annum, £65 each; £7 10s. shares, with a similar dividend, £17 and £17 5s. each; new £30 (7½ per cent.) shares, £56 5s. and £56 10s. apiece. "C" £10 shares (last dividend 5 per cent. per annum, but entitled to 10½ per cent. if earned) in the Waltham Abbey and Cheshunt Gas Company, were knocked down at £12 10s. and £12 15s. each. Fully-paid £10 preference shares (6 per cent.) in the Dorking Water Company fetched £19 each; ordinary shares earning a dividend of 7 per cent., £20 each; and ordinary "B" shares, £18 10s. each. Dorking Gas Company's "A" shares (£25) were sold at £62 and £62 10s. each; and "C" shares (£15 paid), at £31 each. A £50 fully-paid 7½ per cent. share in the Kingston-on-Thames Gas Company was purchased for £92 10s. Ten original £10 shares, fully paid, in the Enfield Gas Company fetched £26 10s. each. "B" stock of the Croydon Gas Company was knocked down at £282 10s. per cent. Three £100 debenture bonds (4 per cent.), having thirteen years to run, were sold at a premium of £5 each. Fully-paid 5 per cent. preference shares in the South-West Suburban Water Company fetched £11 5s. each. Some fully-paid "A" shares (£10) in the Dartford Gas Company were purchased for £24 each. Taking the sale through, the prices, with the exceptions noted, were about on a 4 per cent. basis.

Last Tuesday, Mr. J. Crawter (of the firm of Messrs. Crawter) held a very successful sale of shares in the Waltham Abbey and Cheshunt Gas Company, at the Cock Inn, Waltham Abbey, by order of the Directors. The shares were class "C;" and 125 were offered. The best price obtained previous to this sale was £11 per share; but on the present occasion the bidding commenced at that figure, and rapidly rose to £13 2s. 6d., and £13 5s. The whole of the shares were sold in a quarter of an hour.

The following shares were sold by auction during the past week: Five £10 shares in the Ashford (Kent) Gas Company, at £21 5s. each; one £5 share in the same Company, on which £3 had been paid up, at £6 10s.; and similar shares at £6 12s. 6d. and £6 17s. 6d. each. A parcel of £60 of No. 1 stock (8 per cent.) in the Reading Gas Company was sold for £115; £15 of No. 2 stock (5 per cent.), at £18; and ten £10 shares (7 per cent.), at £161 5s. A parcel of £500 of 5 per cent. debenture stock of the Pocklington New Gas Company, Limited, was sold at Wakefield at par; and ten £10 shares in the Dearne Valley Water Company, for £11 2s. 6d. each.

THE COAL DUTY AT WORTHING AND THE PRICE OF GAS.

Mr. E. P. Burd, one of the Inspectors of the Local Government Board, recently attended at the Municipal Offices, Worthing, for the purpose of holding an inquiry into an application made by the Worthing Town Council for an Order empowering them to abolish the coal duty now levied in a portion of the borough. The Town Clerk (Mr. W. Verrall) said the duty was first imposed in the year 1821; and the receipts for that year were £263. In 1875 they reached £900; but practically there was no regular progress until then. Since that year there had been a large and constantly increasing revenue, till last year the duty produced £1905. The duty acted prejudicially on the industries of the district; and if it were abolished, there would be some gain in respect of gas, which could be supplied at a cheaper rate in proportion to the relief obtained. As the Gas Company's works were in the district liable to the duty, its cessation would be such an undoubted benefit to them, that they would reduce their price, to the advantage, of course, of all the borough. The Inspector asked if it were a certainty that this would be done if the coal duty were taken off. He said he asked that because it was an important matter for consideration—perhaps the most important one advanced. The Town Clerk said it was certain that the price would be reduced. Alderman R. Piper said there would be a reduction of 3d. per 1000 cubic feet. The Town Clerk said the Gas Company, in their Provisional Order obtained last year, were bound by a clause to the effect that if the coal duty were abolished they should make a reduction of 3d. Alderman Piper said that, speaking as a ratepayer, he was not quite certain that it would be the best thing to abolish the duty altogether; but so far as the Gas Company were concerned, it should most decidedly cease. Mr. Beer said the extra cost of coal and gas through the imposition of the duties was prejudicial to the prosperity of the neighbourhood, as people would not take houses at Worthing when they heard of the existence of the dues. The Inspector said he would carefully consider the information placed before him and report in due course.

ELECTRIC LIGHTING NOTES.

Some interesting information was given as to the Corporation electric lighting works at an inquiry held at Bradford, last Tuesday, by Mr. Rienzi Walton, one of the Inspectors of the Local Government Board, whose sanction was sought to the borrowing of £40,000 for extensions. In the course of his opening statement, the Town Clerk (Mr. W. T. M'Gowen) said that the Corporation were the first public body to adopt electricity as an illuminant. They were compelled to take this step in 1888, in consequence of having received notice from several companies of their intention to apply for powers to enable them to commence operations in the borough. An initial expenditure of £20,000 was incurred by the Corporation; and their venture proved to be so satisfactory that in 1890 the works had to be extended at an additional cost of nearly £30,000. In 1893 a further sum of £30,000 was borrowed for extensions; making altogether a total of £80,000, the outlay of which was duly confirmed upon the occasion of each extension by the Local Government Board. Of this amount £74,162 had been actually expended; and there were liabilities to the extent of £3514—leaving a balance of £2324 to work upon. The Corporation now found it necessary to borrow £40,000, which it was proposed to expend as follows: Site, £2609; buildings, £11,500; condensing reservoir and 200 yards of 12-inch iron pipe, £220; machinery, £10,325 (including engines, £4400; dynamos, £2650; boilers, £3000; feed pump, £175; and weighing-machine, £100); steam-pipes, £1135; condensing plant, £1500; electric lighting of building, £50; batteries, £750; switch board, £500; cable, £4000; travelling crane, £320; and cables for changing mains from two-wire to three-wire system, £7000. Evidence was given by Mr. A. H. Gibbings, the Electrical Engineer, in support of the application. He said that in January last the present electric lighting plant was 18 per cent. below the standard requisite to enable the Corporation to adequately deal with the demand; and at the present rate of increase in the requirements, the plant would be 30 per cent. below the demand during the pressure of next winter. No opposition was offered; and the Inspector afterwards visited the site of the proposed extensions.

A correspondent of the "Halifax Courier" has received an ugly shock. He was greatly in favour of electric lighting; and, accordingly, he became a customer of the newly-established electric supply department of the Corporation. His account for the first quarter has been rendered; and it amounts to (for him) the astonishing sum of £7 4s. 3d. Reference to his gas bills shows that, for the corresponding quarters of the last three years, they amounted to: 1893, £2 12s. 5d.; 1894, £2 15s.; and 1895, £3 1s. This demonstrates that the electric light as at present charged for by the Corporation, costs considerably over 100 per cent. more than gas. Testimonials of this description are likely to deter the rapid spread of electric lighting in Halifax.

The Water and Sewage Committee of the Worcester Corporation have taken pity on their colleagues on the Electric Lighting Committee; for, notwithstanding the fact that the cost of pumping water by electricity is considerably more than by steam, they have determined to recommend the Council to pay for current supplied to the water-works motors during the present financial year at the rate of 1¼d. per unit. Last year the charge was 1d.; but the Electrical Engineer states that, when electricity is generated by steam alone, the cost of coal only is 1¼d. per unit.

The Peterborough City Council are not receiving the ready support they expected to their electric lighting proposals. Before coming to a definite decision as to the adoption of a scheme, it will be remembered that they considered it advisable to circularize likely customers, to ascertain the number of lights they would take. The favourable replies comprise considerably below 1000 lamps; the number of consumers being only between forty and fifty. Besides, many of the applicants are resident outside the area to be lighted. The Council, at a meeting in committee, resolved to inquire whether all those in the area who are desirous of having the light have replied to the circular.

Although the Hastings and St. Leonards Electric Lighting Company show an increased income of £1271 from the public and private lighting in the past year, they do not appear to be in a very flourishing condition. It has been found necessary to debit the year's accounts with the loss sustained on the sale of installation stock, and also the bad and doubtful debts in connection with the late installation business. The arc lighting of the sea front has unfortunately not proved remunerative; and if the contract is renewed in June, 1897, it must be on terms more favourable to the Company. The Directors have still, however, great confidence in the stability of the concern; and they believe that, with careful management and strict control over the expenditure, good results will be shown on next year's working. With this view, they have written off every loss they are aware of.

The Southport Corporation are seeking the sanction of the Local Government Board to the borrowing of £4000 for electric lighting purposes; and, in response to the application, Colonel A. G. Durnford held an inquiry last Thursday. The Corporation have already expended £42,822 in the construction of electricity works, and in laying down high-tension cables, transformers, and radiating low-tension mains, &c.; and they now serve by this means 150 private consumers, with 11,500 lamps. The electric energy at the Crowlands station is, according to the Town Clerk (Mr. J. D. Williams), beyond this number of lamps; and the major portion of the £4000 is to be expended in making that power practically available to further customers. It is calculated that the Council will be able to serve another 100 customers without expending more than about £3400, which will mean 7500 lamps, or a total of 19,000. At the close of the inquiry, the Inspector visited the works.

Last Thursday, the Electric Lighting Committee of the Hampstead Vestry reported that they had received from the Vestry Clerk the accounts of the electric lighting undertaking to the 31st of March last, and had given instructions for them to be printed and submitted at the next meeting of the Committee. They also reported that they found that 20 applications for current were received during March, and 15 customers connected, with an equivalent of 1288 8-candle power lamps; that the number of applications received this year to the end of March was 63, and 58 were connected with 3538 lamps; and that the total number of applications to that date was 324, of which 305 were connected with 22,945 lamps, as against 261 applicants and 247 connected with 19,407 lamps at the end of December last. These glowing figures were somewhat discounted by a further batch of complaints. Mr. Newton pointed out that a local firm of grocers at Kilburn were for three hours without any light, "save two miserable gas-jets," which they had fortunately retained when the electric light was introduced. The Engineer was understood to say that there was a "fault in the box"—whatever that may mean. Another member was curious as to the reason why the arc lamps were alight at two o'clock in the morning on a certain occasion. This, too, was owing to a "fault," of what nature did not transpire; but it seems that the whole circuit had to be run so that this fault could be detected. Asked the cost of this little experiment, the Engineer vaguely replied that it was "a very small amount indeed," and that the arcs were those of which Messrs. Siemens recently had charge. Another of these incorrigible arcs went out because "there may have been something wrong with the carbon." If the gas supply behaved like this, would the excuse that there was something wrong at the gas-works avail long?

Last Thursday, Mr. Rienzi Walton sat at the Town Hall, Halifax, to hear evidence respecting the application of the Corporation for borrowing powers to the extent of £32,000, of which £20,000 was required for electric lighting purposes. Regarding this portion of the inquiry, it was pointed out by the Town Clerk (Mr. Keighley Walton) that the Corporation had already obtained powers to borrow £39,950; but their expenditure to date amounted to £43,355, or a sum over-spent of £3405. The balance of the £20,000 included excess of cost on mains and buildings £2950; and the rest was for works in connection with the increased supply of electricity to consumers. He pointed out that the Corporation now served 8000 lamps equal to 8-candle power each; and he was informed by the Electrical Engineer (Mr. T. P. Wilmshurst) that the sum now applied for would carry them over the next four or five years. Replying to the Inspector, the Town Clerk further stated that electric lighting did not yet pay its way in Halifax; but, like Bradford, they would have to wait two or three years. The loss last year, allowing for interest and sinking fund, was £1000; or, if the department had been owned and worked by a private company, it would represent a loss of only £193. Mr. W. C. Hebden (a member of the Town Council) complained that the items contained no estimate for developing the application of electricity for supplying motive power; and he contended that it was impossible to make electric lighting pay unless they could utilize their plant and works during the daytime in supplying current. He also said that there was a great deal of grumbling among consumers, who declared that, if the cost was not by some means reduced, they would have to give up using the electric light altogether. The Town Clerk remarked that what Mr. Hebden ought to do was to get the Council to apply again for further borrowing powers to carry out the work he suggested. This concluded the electric lighting portion of the proceedings.

The Lambeth Vestrymen are still undecided as to the fate of their Provisional Order. At the adjourned special meeting last Thursday, an amendment that this valuable commodity should be put up for public auction was defeated, and several other amendments met with a like fate. No decision was arrived at; and at a late hour the matter was again adjourned. Public meetings in the district are now a nightly occurrence; and it seems as if the forthcoming Vestry elections will hinge on this momentous question.

At the meeting of the Coventry City Council last Tuesday, the Estates and Finance Committee presented a report on the estimates of income and liabilities under the general district fund for the six months ending Sept. 29 next. They included a balance of £1112 due to the Treasurer on the electric light income fund. The expenditure was estimated at £14,385, and the receipts at £3729—leaving a balance of £10,656 to be made up, which would have to be provided by a rate of 1s. 6d. in the pound. In moving the adoption of the report, Alderman Tomson remarked that the Committee only asked for a district rate of 1s. 6d., against 1s. 10d. this time last year, 2s. in 1894, and 1s. 10d. in 1893. Alderman Banks, in seconding the motion, said there had been some discussion outside about the amount required to make up the electric light deficiency, and it had been suggested that it should be made a sort of suspense account. But he believed the Town Clerk and the City Accountant, who were sound on financial matters, thought it best to do as proposed. According to the Act of Parliament, the Council were bound to pay the expenses incurred during the first year. Mr. Andrews (the Chairman of the Gas Committee) said it had been his intention to move an amendment to the effect that the £1112 deficiency should be carried to a suspense account. If this were done, the rate, instead of being 1s. 6d., would be 1s. 4d. in the pound. When the gas undertaking was purchased about twelve years ago, a loss was sustained the first year; but the Gas Committee did not call upon the ratepayers to make good the deficiency. It was carried to a suspense account, and made good out of the profits of the following year without calling upon the ratepayers at all. It appeared to him that the same principle ought to be applied all round. Mr. Neal said Mr. Andrews forgot that the Corporation took over the gas undertaking as a going concern, which had been paying immense profits; whereas the Electric Light Committee had to build up a new business without knowing how it would turn out. After further remarks, the report was adopted.

Special interest attached to the recent election for the Wimbledon District Council from the fact that the policy of the old Council on the electric lighting question, to which several references have been made in our columns, had been seriously impugned. Notwithstanding a very definite expression of opinion by the ratepayers at a public meeting, when 800 voted against the scheme as compared with 11 for it, the Council still went on; and consequently it was only by their votes at the election that the ratepayers could give force to their views. One very marked result was that the champion of the scheme—Mr. A. Holland, the Chairman of the Board—was returned at the bottom of the poll. The ratepayers are now anxiously awaiting the next move; and the most sensible one appears to be a trial of a hundred incandescent gas-lights for a year, and then a poll of the parish on the question of "good gas or unreliable electric light."

THE LONDON COUNTY COUNCIL AND THE WATER QUESTION.

The Welsh Scheme under Consideration.

At the Meeting of the London County Council last Tuesday—Sir A. ARNOLD in the chair—the report of the Water Committee, dealing with the scheme for bringing a supply of water to the Metropolis from Wales, particulars of which have already been given in the "JOURNAL," again came up for consideration, after having appeared for some weeks upon the *agenda*. The Committee recommended as follows: "That (*A*) the Council do approve the following conclusions—(1) That it is in the interests of London that the requisite augmentation to its supplies of water should be derived from some source other than the Rivers Thames and Lea; (2) that the valleys of the Usk, the Wye, and the Towy, with their tributaries, furnish the most suitable area from whence such supplies should be derived; (3) that the Usk and Llangorse section of the Welsh scheme, as set out in the report, should be undertaken in the first instance. (*B*) That the Water Committee be instructed to continue the surveys of the whole of the Welsh scheme, and to prepare such plans, &c., as are necessary in order to enable the Council to apply to Parliament in the session of 1897 for powers to carry out the Usk and Llangorse section of the scheme, together with the requisite conduit to London, and for powers to purchase such sites for reservoirs and such other rights as may be necessary in order to ensure that the other areas referred to shall remain available for the supply of the Metropolis." The Committee added that it would be their duty in due course, to recommend the Council to promote the necessary Bill in Parliament; and as their proceedings under the foregoing recommendation would involve an expenditure not exceeding £10,000, they further recommended "(*C*) That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, we be authorized to expend a sum of £10,000 in relation to the above matter." The Earl of Onslow had placed upon the paper the following amendment to the first recommendation (*A*): "That it is in the interests of London that provision should be made for augmenting the supplies of water to meet the needs which may ultimately be felt, by securing some source in addition to the Thames and Lea; that the valleys of the Usk, the Wye, and the Towy, with their tributaries, furnish a suitable area from some part of which such supplies might be derived; but that, inasmuch as Her Majesty's Government has given notice of legislation on the question of the London Water Supply, it is inexpedient to incur further expenditure until the views of the Government be known. That the Committee do therefore report further on the question this day three weeks."

The Earl of ONSLOW asked leave to withdraw his amendment, inasmuch as the time which had elapsed since the matter was previously under the consideration of the Council had given the opportunity to the Government of introducing the measure referred to therein. He therefore hoped the Council would allow him to substitute another, which was more applicable to existing circumstances, as follows: "That, inasmuch as Her Majesty's Government have introduced a Bill dealing with the water supply of London, it is inexpedient to come to any conclusion on the subject at present, or to incur the expense involved in preparing plans for Parliament; and that it be referred back to the Committee to report what expenditure is necesaary to complete the investigations already undertaken."

The Council refused leave for the original amendment to be withdrawn, and, after the Earl of Onslow had declared his intention of voting against it, it was lost on a show of hands.

Sir J. LUBBOCK, Bart., M.P., then moved the amendment which the Earl of Onslow had desired to substitute for his original amendment, with the addition of the words "it being understood, however, that the Committee are at liberty to continue their inquiries with a view of ascertaining what area or areas may be necessary to supplement the present water supply of the Metropolis."

Mr. C. A. WHITMORE, M.P., seconded the amendment.

Mr. STUART, M.P., asked whether the Earl of Onslow meant, on his authority as a member of the Government, to tell the Council that there was a ghost of a chance of the Government Water Bill becoming law in the present session; and he should like to know why, if there was no such chance, the Council should suspend all their views on the water question. He did not see how the Bill could affect their views. It had served its purpose. It had secured the rejection of the Council's measures. After all, the Government had rejected the Council's measure in the House of Commons because it did not offer enough compensation to the Water Companies. They were not to be allowed to proceed to a second reading unless the Council accepted as a condition precedent that they were to go to arbitration under the Lands Clauses Act. He could not see how, even if the Government Bill were carried, it should hinder the Council from expressing their opinion definitely. The Bill did not propose the purchase of the undertakings of the Water Companies, nor were there provisions for new supplies; it was simply for the formation of a new water authority, which was not to be the County Council. Even if the new authority were constituted, it would have to get information from some source; and he thought there was no body more competent to give that information than the County Council. For these reasons, he should oppose the amendment.

The Earl of ONSLOW held that, in the altered circumstances of the case, and in consideration of the fact that, in all probability at a much earlier date than was anticipated by Mr. Stuart, the Council would cease to be the water authority for London, it was not right or proper that it should pass resolutions in favour of going to Parliament for water schemes which would cost an enormous amount. As Under-Secretary of State for India, it was his duty to have some knowledge of the Ganges; but it was not part of his official duties to assure the Council whether a measure which would meet with the eternal opposition of his friends on the other side would be passed this session or not. He could, however, assure the Council that this measure, as well as others which had been introduced by the Government, would be passed into law if that opposition were withdrawn. He had an open mind between the two great water schemes—that of the Staines reservoirs and the Welsh water scheme. He should be disposed to view with favour the bringing of water to London from Wales, to supplement the existing supply, when that supply was determined to be inadequate, supposing it to be conclusively shown to the satisfaction of the Council that the cost of bringing the water from Wales was not considerably greater than the cost of a scheme of storage of Thames water. He did not agree that the condition of the Thames was likely to be such that it would not produce fit drinking water for the people of London.

Mr. M'DOUGALL opposed the amendment, which was supported by Mr. B. L. COHEN, M.P.

Mr. W. H. DICKINSON pointed out that the amendment asked the Water Committee to do that which they had already done. They had considered the question fully, and their final conclusion as between Wales and the Thames was embodied in a report in which definite recommendations in favour of going to Wales were contained. As long as they were dependent on the Thames, they would be always liable to risk of disease. If the Council did not very soon settle as to whether or not they would take steps to obtain this Welsh area for London, there would be very few areas left in which water could be obtained. He thought it very advisable that the Council should immediately come to some definite conclusion on the matter.

Mr. ELLIOTT was not prepared to say that the Welsh scheme, to cost £38,000,000, was the best one for supplementing the water supply of London. He thought sufficient water for a number of years could be obtained from the Lea and the Thames.

Mr. C. HARRISON, M.P., thought that what was good enough for Birmingham ought, at all events, to be good enough for a supplementary supply for London. Close by the projected source for London was the one adopted by Liverpool. There had been no evidence or suggestion from any quarter as to where they should go except to Wales, assuming that the Staines Reservoirs Bill were thrown out. If they stayed their hands now, it might be that they would find these areas in Wales occupied by other authorities when most they were required. Having spent the money they had, were they to hold their hands because of the Bill introduced into the House of Lords? They knew why the Bill had been introduced; and it had served its purpose. If it ever came up again, let them remember that its fundamental principle was that the County Council would be the chief body represented. After all, the proposed Trust would be more or less a Statutory Committee of the County Council.

Lord FARRER said he could not vote for the amendment. The most important question of all was where London was to get its future supply of water. He should vote against anything that tended to retard that matter. Everything should be done to bring the question before Parliament without delay.

The closure having been carried, a division was taken, when there voted: For the amendment, 52; against it, 56—majority against, 4.

Subsequently, Mr. H. P. HARRIS moved, and Mr. HOARE seconded, an amendment which made the first recommendation of the Committee read as follows: "That it is in the interests of London that the requisite augmentation to its supplies of water, to meet the needs which may ultimately be felt, should be derived from some source other than the Rivers Thames and Lea;" the words added being "to meet the needs which may ultimately be felt."

The Council divided, when there voted: For the amendment, 55; against it, 51—majority for, 4.

Mr. E. WHITE then moved, and Mr. REED seconded, the adjournment of the debate, which was defeated upon a division.

Two ineffectual attempts having been made to postpone the matter, the recommendation as amended was agreed to.

The second recommendation, after verbal amendments proposed by the Earl of ONSLOW and seconded by Colonel FORD, was agreed to as follows: "That the valleys of the Usk, the Wye, and the Towy, with their tributaries, furnish a suitable area from which some part of such supplies might be derived." It was next agreed: "That the Usk and Llangorse section of the Welsh scheme, as set out in the report, should be undertaken in the first instance." On recommendation (*B*),

Mr. WESTACOTT moved, as an amendment, the addition of the following words: "And that it be referred to the Finance Committee to report to the Council at as early a date as possible as to what effect the carrying out of this scheme will have on the rates of London."

This was agreed to.

On the motion that the recommendation, as amended, be agreed to, a further discussion took place; and it was ultimately agreed that the recommendation should be withdrawn—it being understood that a further report on the matter would be brought up.

The Administration of the Hull Water-Works.—A Sub-Committee of the Water Committee of the Hull Corporation have been inquiring into the administration and working of their department, so far as the engineering section is concerned. The proceedings have been conducted in private; but it is stated that nearly all the men and officials employed at Springhead Works and the Mill Dam Springs, as well as outside officials, have been examined. The full Committee met last Wednesday to consider the report of the Sub-Committee. It is understood by the "Hull News" that it contains some very strong expressions of opinion as to the state of affairs, and the competency, or rather alleged incompetency, of those engaged at the works. One ground of complaint is as to the want of mechanical knowledge in respect of engine construction; but no fault is found with the stokers and cleaners. The Sub-Committee, it is believed, made some sweeping recommendations so far as the chief officials are concerned, which went to the length of suggesting that their positions should be filled by new appointments. This applied to the Engineer-in-Chief, the foreman engineer, and turncock and water inspector. The erection of new engines at Springhead is considered desirable; also the formation of a new main from Mill Dam to Stoneferry, and the sinking of two new shafts at Cottingham. The Sub-Committee are of opinion that the Stoneferry works should then be dismantled, and the property sold. The Committee adopted the report by ten votes to five; and it will now have to be submitted to the Council.

THE NEW WATER SCHEME FOR NOTTINGHAM.

We conclude to-day our report, commenced on the 14th inst. (p. 821), of the proceedings at the inquiry lately held on the above subject before Colonel J. O. Hasted and Mr. E. P. Burd. It will be remembered that the scheme was vigorously opposed by neighbouring Local Authorities.

At the close of the address of Mr. Shiress Will on behalf of Mansfield,

Dr. BLAKE ODGERS, speaking first for the Southwell Rural District Council, said it was a surprising and wondrous thing for Nottingham to wish to take them over. He had no doubt the present area was supplied with excellent water, and he could not see why the Corporation should want to take upon their hands the two outlying parishes of Oxton and Epperstone. At Oxton, the inhabitants wanted to have their water supplied by Nottingham; and he should make no opposition if there was going to be an Order. But the time would no doubt come when Southwell would have to manage its own water supply; and the Corporation could well do without Epperstone, which was a long way from the borough. With regard to Hucknall, the Local Authority in 1879 obtained the sanction of the Local Government Board to the construction of water-works; and in the following year a well was sunk. At that time there was no well within a considerable radius; but three years afterwards the Corporation of Nottingham sank a well at Papplewick within three-quarters of a mile. The immediate effect was that Hucknall had to lower its well some 45 feet; and they had to make another well the same depth. The first cost of the works was £16,000; and the increased expense to which Hucknall was put by the Nottingham Corporation sinking their well at Papplewick was £3500. Now it was proposed to sink another well on the other side, so that Hucknall would be between two wells belonging to the Corporation. The strata dipped right away down from the Hucknall well to Woodborough; and if the storage of water in the district could be tapped, Woodborough was the place to do it. He did not think the Commissioners would recommend that Nottingham should be allowed to have the unrestricted right to pump this water to any amount.

Mr. *W. H. Radford* gave evidence supporting the learned Counsel's statements. With reference to the fact that Nottingham was short of water, and must get it elsewhere, he proposed, as an alternative scheme, that the Corporation should go six miles north of where they had bored; and they would there find 36 square miles of water totally untapped. Eakring, the place he suggested, was six miles from the Oxton boring. The expenditure of the sum of £10,000, with one pumping-station at Eakring, would give them the command of an area as large as that now worked by the eight local pumping-stations. From his calculations, witness believed that, if Nottingham were to draw more than a million gallons a day from Woodborough, they would do it at the expense of Hucknall and Papplewick.

Cross-examined by Mr. PEMBROKE STEPHENS: Hucknall was not sure that, even now, they would have enough water supposing Nottingham did not put down another well. The present head of water was being diminished at the rate of 2 feet per year.

Re-examined: Hucknall, by increasing their cone of depression, might eventually tap certain springs which were now running their water elsewhere, and thus keep up their present supply; but not if Woodborough was made a pumping-station.

Mr. *James Shipman*, F.G.S., examined by Dr. BLAKE ODGERS, said the Corporation well at Papplewick, the Hucknall well, and the borehole at Grimesmoor were in a direct line; and the effect of the Woodborough well would be to effectually drain that of Hucknall.

Before evidence was called the next morning,

Mr. BALFOUR BROWNE again raised the point as to the desirability of calling further expert evidence. He observed that, on the previous day, one of the Inspectors, referring to a question touched upon by Dr. Blake Odgers, had remarked: "We do not want to go into that matter, because it cannot affect the 'issue of the inquiry.'" He (the learned Counsel) had therefore determined to reserve his opposition, if it should go further, to another place.

Mr. HUGO YOUNG intimated that he should adopt the same course as his learned friend.

Mr. *W. Swann*, Engineer to the Hucknall Torkard District Council, was then called. He said he knew the nature of the water-bearing sandstone which lay under the Hucknall Torkard pumping-station in all directions for some distance. Most of it was to the east; and the strata dipped from Hucknall Torkard towards the Woodborough pumping-station. A well was sunk at Hucknall Torkard in 1880; the depth of it being 84 feet. Before the Papplewick pumping-station was erected by the Nottingham Corporation (to the west) the water in the Hucknall well rose to within 59 feet of the surface, and remained at that level while there was no pumping. During the past twelve years, the normal level had dropped 24 feet. The well had been lowered 41 feet; and a new one had been sunk. The effect, in his opinion, of the opening of a well at Woodborough would be that the level of the water in the well at Hucknall Torkard would be reduced still more. It was possible for one of the wells to be sunk an additional 70 feet, and the bottom would still be in the Bunter. But, even then, the bottom would be only 35 feet from the top of Papplewick well.

In answer to Mr. PEMBROKE STEPHENS, witness said the level of the water had fallen not only in the Hucknall Torkard well, but also in others in the district.

The case for the Notts County Council was next presented.

Mr. *Wright*, the Chairman of the Health and Sanitary Committee of the Council, said they were not opposing the Corporation scheme in any spirit of hostility. They were trying to protect those who had vested interests in the district, and to save money from being wasted. The County Council based their case upon a report prepared by Professor Boyd Dawkins. The whole thirteen wells in the district drew their water from the same Bunter, with the exception of the well which obtained its supply from the sandstone. As the deepest wells were in the east, they would have the best supply of water; and the effect on the water in the others must naturally be that, if it were not entirely drained, it would be considerably lowered. The reduced level of the Papplewick and Bestwood wells showed to what extent the deep springs were being affected even now. He looked upon the scheme as a stop-gap; and the County Council felt that, if the scheme must be framed, it should have been complete, so that they could have taken the opinion of experts upon it as a whole.

Professor *Boyd Dawkins* was of opinion that the proposals of the Corporation, if carried out, would have the effect of lowering the general level of the water in the subterranean reservoir; and the wells would certainly suffer permanently by the reduction of the water-level. The existing pumping-stations were all, in his opinion, drawing their supply from the same reservoir; and the result of adding another pumping-station would be to accelerate the rate of fall of the water-level in the area. There had been a permanent reduction of 28 feet in the level of the Bestwood well. This had been a gradually developing quantity; and he did not believe it was explicable by the fluctuations in the rain. Evidence obtained at Woodborough as to the behaviour of the water in the local wells showed that they were in entire sympathy with the Corporation boring. The surface water in the area had also been seriously affected. It seemed to him that the scheme was extremely bad and inadequate; and having regard to what had taken place in the other Corporation wells, he did not look upon this as a permanent supply. The coal workings were gradually extending in the locality; and to take water from the district would be a serious injury to the spread of population. He thought a complete scheme should be presented in common fairness to all concerned.

By Mr. HAMILTON: For some distance in the area of the Woodborough pumping-station, there were impervious pebble-beds; and through these the water of the Dover Beck, after running along the surface to a certain distance, would be drawn down.

In cross-examination by Mr. PEMBROKE STEPHENS, witness said the greater the rainfall, the higher would be the level in the subterranean base. There was no formula which gave the saturation of certain rocks from a given rainfall.

Mr. POLLOCK, for the County Council, said their opposition was solely in consequence of the opinions and advice submitted to them. The condition of the district supported the theory of the Council that all the wells were practically drawing their water from a common source; and on this point he addressed the Inspectors at some length. He was anxious to establish the point that, in dealing with this district, the greatest care and the greatest research should be necessary; and they must be most careful as to what was done, so as not to make a mistake and create a great injury, either to the surface waters or the wells, by the proposed scheme. At the present time, the Corporation had not water to give to the districts which they proposed to embrace. That this was so, was shown by a report of the Water Committee, about a year ago, which stated that the supply was a matter of "grave anxiety" to them; and both Professor Hull and Mr. Gaskin had reported, without any reference to the extension of the limits of supply, that it was now time to construct new works. Surely, Counsel remarked, the Corporation would not make their supply better by taking in another population. In face of the evidence that had been adduced, the County Council felt that the sinking of the proposed wells would be an injustice to the people of the district.

Mr. TOLLER, for Sutton-in-Ashfield, submitted that, if the present application was not *bonâ fide*, and the motive of the Corporation was to get another scheme through under cover of this one, the Inspectors should report to the Local Government Board that the application should not be granted, and that they should wait until the Corporation brought forward their real scheme, binding the two together, in order that the larger scheme might be fully gone into and reported upon to the Board. Through the geological formation, the Sutton-in-Ashfield Authority could not get water in their own district; and the streams were polluted. They had therefore taken a share in the Dover Beck area. It had already cost them upwards of £30,000; and with the increasing population, they would have to get a new site for sinking a well in the near future. He did not admit that the Woodborough borehole, if it came into use, would not affect them. Certainly as regarded the Oxton borehole, it would prejudice them considerably.

Mr. HAMILTON, in addressing the Inspectors on behalf of the mill-owners on the Dover Beck, suggested that the Corporation would not propose to impound the water upon the surface because they would have to compensate his clients; and their desire was to get power to take the water in another way, so that they should not be called upon to pay them a single penny.

Mr. PEMBROKE STEPHENS, in reply, submitted that the opponents had shown all through the case that their object was not to discuss this application on its merits but to use it as an opportunity of opposing something else; and when they found that the opposition could lead to no practical result, some of his learned friends had actually retired, on the ground that they must reserve themselves for some other opportunity. That was not a *bonâ-fide* opposition.

Mr. HAMILTON inquired if his learned friend would pledge himself to go to Parliament if this Order was granted.

Mr. PEMBROKE STEPHENS said his friend was again putting upon him something that was not the case. They had not the money nor the works; and his friend could draw his own inference.

Mr. BURD asked whether they could report that the Corporation had power at present to sink these wells.

Mr. PEMBROKE STEPHENS replied that he did not know honestly what the Corporation scheme was; and, therefore, he could not pledge himself to anything. They had sunk boreholes, and obtained water as recently as January last; and they had been making arrangements with the outside districts. No doubt when the scheme was completed and matured, the question would be up again. A further application must be made, as they would want £100,000 or £150,000.

Mr. BURD asked if the Corporation had power to sink wells within their limits and on this area.

Mr. PEMBROKE STEPHENS said, as far as he was aware, they had not. What he believed the Order would do was that it would give them power to extend their pipes throughout the new district, and make the Corporation purveyors in the ordinary sense of the term; but as to constructive works, it made absolutely no difference. As far as he could see, the Order would not prejudice his friends in any way.

The inquiry then terminated.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

On Monday night of this week, the Forfar Gas Corporation met to consider the report by Mr. A. Vernon Harcourt upon the accident which took place at the gas-works last November. What consideration a collection of people who have not shown even an average aptitude for conducting a gas undertaking could have given to a report by an expert appointed by Government, it is difficult to realize, unless it were, as Provost M'Dougall said, the recommendations as to precautions to be taken to avoid further accidents of the same kind. Mr. Adamson moved that they hold the report as read, and take no further notice of it. Mr. Christie, who seems to be the leader of the party of irreconcileables, thought Mr. Adamson's proposal was a most extraordinary procedure connected with what was a serious explosion; and he moved that it be remitted to the Committee to consider and report to the next meeting of the Corporation what should be done in the matter. Provost M'Dougall then said that, at the end of the report, Mr. Vernon Harcourt made some suggestions; and he thought that the Corporation should look into these things. Mr. Adamson acquiesced in the remit; and he asked if the report had cost the Commissioners anything, to which the Clerk replied that all they had to pay was a small fee to Preston. Preston was the man who had been discharged from the works; and he was the only one of the witnesses examined who was not in the employment of the Corporation at the time of the inquiry. The subject thus goes to the Committee, who are to meet at the works some afternoon and consider what they should do in the matter of dealing with Mr. Vernon Harcourt's proposals; and possibly there may be other suggestions made.

It is sufficient to show the temper of a portion of the Corporation towards the management, to mention one or two incidents which took place at the meeting. In passing accounts for payment, Mr. Christie wanted to know about an item of £3 odd for the hire of a crane. Mr. Forbes Waddell, the Manager, replied that the crane was required in connection with the erection of new purifiers. Again came the question from Mr. Christie whether the crane was broken, to which Mr. Waddell replied that it was; but that the charge included the cost of repairing it. Such trivial questions should never be put at a meeting of a public board. Mr. Craile, the Convener of the Committee, moved that a remit be made to the Committee to advertise for coal for the works. Whereupon Mr. Christie said that, if they were to advertise for the same kind of coal as they had, they would produce the same kind of light. He objected to this. Cheap gas was a sham; and they should have a better class of coal. A word or two from Mr. Craile showed the hollowness and the absurdity of raising the question. They would, he said, get offers of all sorts of coal suitable for gas making; and they could select what they liked. That disposed of, Mr. Christie tackled the subject of the quantity of coal in hand at the time of stock-taking; and he said he thought that at such a time it should be *nil*. Of course, it would be impossible to have this state of matters; but an order was given to have the stock as low as possible. Then Mr. Christie endeavoured to introduce a question regarding a man named Stark, the stoker injured by the accident, along with Mr. Waddell. Mr. Christie said that the Corporation had, in their wisdom, elected to allow the Manager to retain the power of dismissing the men at the works; and some weeks ago Stark complained to him that he had been dismissed, and that he considered he had been unfairly used. He supposed they all knew that this man, through carrying out what was a very reckless order ———. Here Mr. Christie was stopped by the Provost, who wished to know if there was any petition before them. There was none; and Mr. Christie therefore had to content himself with the reflections that Stark might have a claim for damages against them for the injuries he sustained, and that the Manager should have had some consideration for the man. Instead of this, however, he had taken the first opportunity of sending him to the door. Mr. Waddell asserted that Stark left of his own accord—that he was dismissed, but was taken back, and afterwards left of his own free will. Mr. Christie replied that that was the Manager's statement, which plainly shows the attitude he desires to hold towards Mr. Waddell. Such are the petty annoyances to which Mr. Waddell is subjected. Other managers will see that his position is a most unenviable one.

The Perth Gas Commission met on Monday, and agreed to a contract with Messrs. Ashmore, Benson, Pease, and Co., Limited, for the erection of a wire-rope guided gasholder, at the price of £6393. In moving the recommendation of the Committee on the subject, Bailie Wright said that the system of wire-rope guiding would save them over £2000; and that the information they had from England was that such holders were by far the steadiest in a storm of wind. One member thought it was perfect nonsense to talk in this way; but as he was certainly speaking about what he had no knowledge of, his remarks were unheeded, and the recommendation was agreed to.

The Greenock Police Board, on Tuesday, had before them the subject of extending the retort-bench at the gas-works, and the mains in the town. The Gas Committee reported that they had given the subject their fullest consideration, and had formed the opinion that the extensions were necessary, in view of the increasing demand for gas. The proposed additional retort power had been the subject of very thorough and careful investigation. Several gas-works in which regenerative systems of furnaces had been adopted in recent years had been visited; and particulars had been obtained as to the respective cost of erection and the results which had followed upon their introduction. The Committee were not prepared to recommend the adoption of any particular course in the meantime, as they desired, before making a recommendation on this portion of the remit, to have further opportunity to consider the information which had been secured in the course of their inquiries. Bailie M'Innes, in moving the adoption of the report of the Committee, said that, while the Committee did not wish to hasten the subject of retort extension, it was desirable that the work should not be much longer delayed, because of the rapidly growing demand for gas in the town, which made it necessary that they should provide a safe margin at the works; and to do this, they must have extra producing power. Bailie Mitchell, in seconding, said their proper course was to extend the producing power before enlarging their mains. Last year they sometimes had to leave their pipes empty of gas to a considerable extent; and it was their duty to see that this did not occur again. Dr. Calder thought that before going to such expense they should seriously consider the question of lighting the town by electricity. This red herring was promptly thrown off the track by Mr. Cameron, who said that the Committee were fully alive to the subject, but that whether electric lighting was introduced or not, the improvements mentioned in the report were necessary. The Committee's report was adopted.

The Board also agreed, on the recommendation of the Manager (Mr. S. Stewart), to purchase 20,000 tons of coal for the gas-works, at an average price of 8s. 7¼d. per ton delivered, and gave power to the Committee to secure other 2000 tons of cannel and splint, in equal quantities, as the prices may appear favourable.

The Corporation of Paisley have secured their splint coal supplies for the forthcoming year at prices from 7s. 3d. to 7s. 6d. per ton. These rates, it is estimated, will yield to the coalmaster from 4s. 6d. to 4s. 11d. per ton at the pits. A writer on the subject says: "This is but one illustration of the competition which exists at present for securing business, and of the anxiety of some colliery owners to obtain contracts at prices which make it difficult to see how they can expect to implement them without serious loss—a policy which, in the event of any trouble occurring with the miners, would no doubt be matter for comment, more or less severe, by the men's leaders. Of course, a great many of the coalmasters are declining to quote on this low basis; preferring rather to dispose of their outputs in the open market than accept such prices." I do not know if this writer has special knowledge on the subject; but I cannot understand why he should single out Paisley for particular mention. I am afraid he is wrong in the matter of coalmasters holding back from contracts. So far as I can learn, prices are down everywhere; and instead of coalmasters showing a disposition not to contract, it is rather that the owners of gas-works are passing certain qualities by, much to the consternation of some sellers. The advent of so much enrichment by other processes than coal is having an effect on the coal market already; some better sorts being in continually less demand, and the owners being obliged to offer them at lower prices in order to get them off their hands.

At a meeting of the Police Department of the Glasgow Corporation, on Monday, Mr. Primrose moved the resolution of which he had given notice, to the effect that the Watching and Lighting Committee should consider whether the present arrangement, under which the Committee pay the same rate per 1000 cubic feet for gas consumed in street and stair lighting, was equitable; and whether means could not be devised for improving the general lighting of the city. Lord Provost Sir James Bell said that, in view of the Acts of Parliament which regulated their gas supply, the Corporation could not carry the motion into effect, even though they should adopt it. It would be necessary to put into the resolution that they apply to Parliament for powers. Mr. Crawford thought the Committee might consider whether anything could be done in the matter, as a preliminary to asking for powers. The resolution was, therefore, not put to the meeting. The Committee can surely look into the subject without a remit.

The Gas and Electric Lighting Committee of the Aberdeen Town Council have resolved to recommend the expenditure of between £7000 and £8000 upon the extension of the electric lighting undertaking, which will practically double the capacity of the works. The Corporation are at present engaged in considerable extension of the regenerative system of firing—the Siemens—which is in use in the gas-works. When the present work is completed, there will not be a retort which will not be fired upon the regenerative system; and the whole will be served with West's drawing and charging plant. Two new exhausters are also being fitted up; the great increase in the demand for gas having made the existing exhauster plant rather dangerously near safety in the dark days of winter. Having this week had the pleasure of seeing the Aberdeen Gas-Works, I feel bound to say how delighted I was to observe the order and perfection of every department in them, and how entirely up-to-date the Manager (Mr. A. Smith) keeps the undertaking under his charge. It is gratifying to know that he is at last to be provided with a new set of offices in the works—a branch of the establishment which he has not hitherto pressed upon the Corporation, but which now, when the working portions have been attended to, is also to be put right.

The first move in the matter of the transfer of the undertaking of the Dunfermline Gaslight Company to the Corporation, under the Burghs Gas Supply Act, has been taken. The Law Agent of the Company has written to the Town Council, intimating that they will be pleased to have an offer for the undertaking. In the meantime, the Corporation are considering as to the appointment of a technical adviser. The negotiations are at a delicate stage. The Corporation cannot very well make a proposal unless they are afforded facilities for making up their minds as to how much to offer; and, considering that the relation of buyer and seller all the world over is one more or less of antagonism, it is not very probable that any facilities which might be accorded would be of much value. The natural end will, in all probability, be arbitration. The Company have, by their notices, placed themselves in the position of being unwilling sellers, which would give them some advantage before Arbitrators.

The Lennoxtown Gaslight Company have paid a dividend at the rate of 10 per cent. for the past year, and have reduced the price of gas from 5s. to 4s. 7d. per 1000 cubic feet.

At the end of January, the revenue from gas residual products for the present financial year of the Glasgow Corporation Gas Trust amounted to £80,336, which was £12,841 less than that for the corresponding period of the year 1894-5—seven months—and during the month of February the decrease in the revenue from that source went on waxing in a marked manner. On the 28th of that month, it was reported by the Treasurer (Mr. Fleming) that the decrease over the period of eight months had grown to £14,473—the income in 1895-6 being only £92,447, as compared with that of the corresponding eight months of the preceding financial year. This diminution in the revenue from residuals took place even with a very material increase in the quantity of coal carbonized. Fortunately, the revenue from the sale of gas was

very much up; amounting on the 25th of March to £10,871 above that of the corresponding portion of the year 1894-5.

The arrangement which I mentioned last week as being proposed between the Police Commissioners of Carnoustie and the Dundee Corporation, for a supply of water to the burgh of Carnoustie, has been completed this week. On Monday, the Dundee Town Council agreed to the terms proposed; and on Wednesday, the Police Commissioners of Carnoustie met and ratified the agreement. The Commissioners expressed great gratification at the handsome manner in which they had been treated by the Dundee Corporation.

The inhabitants of Arbroath were on a recent occasion nearly deprived of their water supply, by the breaking of a pin in the crank of a three-throw pump at the Nolt Loan pumping-station. A two-throw auxiliary pump was started, to take the place of the broken one; and with this it was thought a sufficient supply of water could be sent into the town. But in Arbroath a supply of 8 gallons per head per day is considered to be sufficient; this being all that they can procure with their present plant. The supply is at all times precarious enough to lead to doubt as to the efficiency of the system of water supply; but with a breakdown, the situation is almost alarming. Yet the community of Arbroath last November rejected a well-prepared scheme of water supply on the gravitation principle, by Mr. J. Wilson, of Edinburgh, and resolved to extend their pumping plant. Such an incident as that above recorded should lead to reconsideration of the subject. There is scarcely any need for pumping water supplies in Scotland, where there is abundance of water at a high elevation, and usually at a moderate distance.

On Tuesday, the 7th inst., a new water supply for the village of Gullane, on the Haddingtonshire coast, was formally turned on by Mrs. Nisbet Hamilton-Ogilvy, the proprietress of the district. The supply has been derived from a well which has been sunk to a depth of 110 feet. A 4-inch trial bore, which was sunk for 200 feet at a distance of 25 feet from where the well is situated, is connected with the well, at the bottom, by a mine. There is a yield of water of about 50 gallons per minute, or 72,000 gallons per day; and at present it stands at about 70 feet from the surface. The water is pumped, by means of an oil-engine, into a tank of 100,000 gallons capacity, from which it is supplied to the village. The plans for the work were prepared by Messrs. Belfrage and Carfrae, of Edinburgh; and the cost—about £2250—has been in the meantime borne by the proprietress. There are two interesting features in connection with this new water supply. Before commencing the work, Mrs. Hamilton-Ogilvy procured the services of a water diviner; and the well was sunk where he indicated that water would be found. His prediction has turned out to have been well warranted. The other feature is that the water supply is intended to promote the extension of the village. The village is the centre of—it may almost be said to be the home of—the Royal game of golf, which has taken such a hold upon the community. There are seven golf courses in its neighbourhood; and it was to meet the clamant needs for extended lodgings for the devotees of golf, that it was felt to be necessary to provide an efficient supply of water.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *April* 25.

Sulphate of Ammonia.—There has been more inquiry, resulting within the last day or two in an advance of about 2s. 6d. per ton all round. The demand, however, seems to have been for "covering" sales for April delivery; buyers having left this operation until rather late in the month, and being obliged ultimately to pay the advance required. The closing quotations are £7 17s. 6d. per ton f.o.b. Hull and Leith; and £8 f.o.b. Liverpool. The firmer spot market has put more heart into makers; and, in the meantime, they do not seem inclined to sell anything but prompt, unless at a further advance. Whether this attitude is justified, will be seen when covering for April is completed. In the forward position, too, makers are firmer. But buyers are indifferent, unless at about prompt prices; and no further business of importance is reported. It may be well to point out that the forward sales in London recently reported at £8 were on net and special terms.

Nitrate of Soda is unchanged.

LONDON, *April* 25.

Tar Products.—A little more business is being done in pitch for next season's delivery; most makers being fully sold for this season. Buyers, however, speak of lower prices, and hope to see a further fall in this article. There is no life in benzol; and it continues dull and uninteresting. A better feeling, however, is reported in the aniline market. It is stated that the over-purchases and the over-shipments to the States have now been overtaken by an enlarged consumption; and it is suggested that a better and continuous outlet for aniline will follow. There is a capital inquiry for anthracene; and as stocks continue low, the future of this article is more encouraging. Creosote and common tar oils are weak, with a tendency to fall to still lower values—indeed, many distillers are now burning them for fuel in preference to taking the low prices offering. Solvent naphtha is in moderate demand. Crude naphtha, however, is neglected; and it is only those who are well sold in benzol who can afford to pay the present quoted prices for this article. Only a poor market presents itself for carbolic acid and its congeners. Makers, however, are well sold, and can afford to look easy upon the market fluctuations. Some important tar contracts have been let at prices quoted below. The outlook for tar products, on the whole, is not particularly bright; and distillers would be wise to bear this in mind in purchasing tar for forward delivery.

Prices: **Tar**, 19s. to 23s. 9d. Pitch, 30s. to 32s. 6d. Benzols, 90's, nominal, 1s. 10d. to 2s.; 50's, 1s. 7½d. Toluol, 1s. 5d. Solvent naphtha, 1s. 3d. Crude, 30 per cent., naphtha, 9d. Creosote, 1d. Creosote salts, pressed, 52s. 6d.; drained, 30s. Cresylic acid, 1s. Carbolic acid, 60's, 2s. 1½d.; 75's, 2s. 4½d. Anthracene, "A," 10½d.; "B" quality 8d. to 9d.

Sulphate of Ammonia shows no signs of improvement. Business goes on in a sluggish sort of way; and fair quantities are changing hands at prices ranging between £7 15s. and £7 17s. 6d. country ports, and £8 Thames, all less 3½ per cent. Gas liquor is quoted at 5s. to 6s. 6d., 10-oz. quality.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—Only a slow demand is reported generally for all descriptions of round coal; and though pits, as a rule, are not working more than about four days per week, supplies continue in excess of the demand. House-fire qualities are in but limited request; and prices in the open market are weaker, though quoted list rates remain nominally unchanged. The lower descriptions of round coal still move off very slowly, for steam, forge, and general manufacturing requirements; and with supplies hanging upon the market, prices are cut to an excessively low level to secure business. At the pit mouth, best Wigan Arley does not fetch more than 10s. per ton; seconds Arley and Pemberton four-feet, 8s. up to 8s. 9d.; common house coal, 6s. 3d. to 6s. 9d.; and ordinary steam and forge coals, 6s. A good demand comes forward for engine classes of fuel; and in some cases, where collieries are rather short of supplies, a hardening tendency in prices is noticeable. Here and there, a slight advance on late quotations has been secured; but this is only in special cases. Prices generally, though firm, remain without appreciable change; 3s. to 3s. 6d. per ton for common, to 4s. and 4s. 6d. for better sorts, and 5s. for special qualities, being the average figures. In the shipping trade, the depression is such that some of the collieries are declining to compete for orders at the extremely low and unremunerative figures at which business recently has only been obtainable. Delivered at the High Level, Liverpool, Garston Docks, and Partington tips on the Ship Canal, common steam coal remains at about 7s. to 7s. 3d. per ton.

Northern Coal Trade.—There has been a very decided increase of activity in the steam coal trade, and higher prices are now quoted; while the loading turns are longer with most of the steam coal collieries. For best Northumbrian steam coals, the quotation is at present 8s. 3d. per ton f.o.b.; the commencement of the shipping season for Cronstadt being now at hand. The importance of the market is to be judged from the fact that to this one port alone, there is often sent from the Tyne 1000 tons of coal daily; so that the opening of the Russian trade invariably gives something of a stimulus to this branch. Steam small coals are also firmer, at from 3s. 6d. to 4s. per ton; while the demand shows signs of further improvement. In household coals, the demand is limited; and the price is consequently very weak. The supply is abundant at 10s. per ton f.o.b for shipment; while for land sale supplies, about 11s. 6d. per ton and upwards delivered is the current quotation. There is a better demand for manufacturing coals; but the price has not altered. Gas coals are now in very limited consumption. The price for best Durham gas coals is about 6s. 3d. to 6s. 6d. per ton f.o.b.; but one of the large producing firms asks considerably more. The coke trade is very firm. The export demand now show signs of enlargement; and the home consumption is about at its highest point in the north-east. In the north-west there is also a steady demand, which is expected to be increased when additional furnaces are put into operation at Maryport. There is no alteration to report this week in the gas coke trade, either in the demand or in the prices quoted.

Scotch Coal Trade.—There is still no advance in prices for coal in Scotland; but the demand continues good, and a large volume of business is being done. Contracts are being entered into, for gas-works supply, at reduced rates from last year. The iron and steel trades are abnormally busy, which gives good ground for the expectation that the demand for coal will hold for some time yet. The prices quoted are: Main, 5s. 9d. per ton f.o.b. Glasgow; ell, 6s. 3d. to 6s. 9d.; splint, 6s. 3d. to 6s. 6d.; and steam, 7s. 6d. The shipments for the week amounted to 142,345 tons—an increase of 27,467 tons on the preceding week, and of 23,879 tons upon the corresponding period of last year. For the year to date, the total shipments have amounted to 1,889,750 tons—an increase upon the quantity in the same period of last year of 129,522 tons.

Exhibitions of Gas Appliances.—Messrs. W. Parkinson and Co. held a very successful exhibition of gas appliances at Builth Wells on Tuesday, Wednesday, and Thursday in the week ending the 18th inst.; and during the past week they have been exhibiting in the Public Hall, Smethwick. At each place they had the assistance of Miss Edith Sanderson to give lectures on cookery. Under the auspices of the Gas Committee of the Sutton-in-Ashfield District Council, an exhibition of gas appliances was held by various firms last Tuesday, in the Town Hall, with Miss Richards as cookery demonstrator. On the same day, Messrs. Fletcher, Russell, and Co., Limited, opened an exhibition at St. Bartholomew's Rooms, Bristol.

The Price of Gas at Swansea.—A deputation has recently waited upon the Directors of the Swansea Gas Company, to ask for a reduction in the price of gas and the provision of better facilities for the lighting of ordinary dwelling-houses. Mr. Moxham, who acted as principal spokesman, asserted that the price of gas in Swansea was higher than in other towns, and that the Company were endangering their position by maintaining an excessive rate. If a reduction was not made, the Company would be playing into the hands of the advocates of electric lighting, and thus be laying themselves open to serious opposition. Another member of the deputation—Captain Sinclair—suggested that incandescent lights should be used throughout the town. The Chairman of the Directors (Mr. Travers Wood), in reply, said that the price of gas would have been reduced but for the fact that the Company had suffered heavy losses through works being closed in the district, and through the depression in trade generally. They had also suffered greatly through the breakage of pipes. Mr. W. J. Lambrick hoped the Company would see their way clear to provide better facilities for the working classes. The Chairman replied that the Company were not prepared to reduce the price of gas; but they were willing to lay gas-pipes into any working-man's dwelling-house free of charge. The Manager (Mr. Thornton Andrews) also announced that he was prepared to supply gas-fittings to any working man at practically cost price; and as soon as the Company could see their way clear to do so, they would reduce the price of gas. The interview concluded with thanks to the Company for their courteous reception.

The Expenditure on Street Lighting in Leeds.—During the twelve months ended March 25 last, the Lamp Committee of the Leeds Corporation spent £25,071 in connection with the lighting of the public lamps in the city. The chief items of expenditure were: £16,679 for gas; £6036 for lamplighters' wages; £1147 for new lamps; and £528 for repairs. The income of the Committee for maintenance of private lamps, as discount, and from other sources, was £926.

Artesian Wells at the Slough Water-Works.—Steps have recently been taken to largely increase the supply of water for the district served by the Slough Water-Works; and for this purpose the Engineer (Mr. Secker) has had a series of three 11½-inch artesian tube-wells bored by Messrs. Le Grand and Sutcliff, of London, to an average depth of 150 feet; the chalk formation being reached at from 61 to 72 feet below the surface. The boring operations occupied ten weeks, or an average of twenty days each, including the pumping trials. The three wells are to be coupled to one receiving-main; and their united yield is equal to a supply of nearly 2 million gallons per diem.

New Joint-Stock Companies.—The recently-registered limited liability company of Messrs. Walker, Carver, and Co., whose object, with a capital of £50,000 in £1 shares, is to carry on business as manufacturers of varnishes, &c., at Salford and elsewhere, announce that they propose to erect and construct gas-works, water-works, &c. A company has been registered under the title of Messrs. Bird and Son, Limited, with a capital of £80,000, in £10 shares, to carry on business as manufacturers of, and dealers in, coke, tar, pitch, ammoniacal liquor and other residual products of coal, as carbonizers of coal, naphtha distillers, manufacturers of alizarine, coal tar colours, &c., at Cardiff. One of the objects of the Menzies Gold Development Company, Limited, which has been registered with a capital of £250,000, in £1 shares, is to operate gas, electricity, and water works.

The Drainage and Lighting of Monmouth.—The Corporation of Monmouth have just received the consent of the Local Government Board to carry into execution a somewhat novel scheme of sewerage and electric lighting. Owing to the configuration of the ground at Monmouth, all the sewers are to be made to converge to a central pumping-station before their contents are conveyed to the outfall on the outskirts of the town. During the hours of darkness, however, the machinery which is to be employed for working the pumps will be used for lighting the borough with the electric light, and the sewage will then be collected in a large underground tank, where it will undergo a preliminary purifying treatment. The motive power, both for working the pumps in the daytime and driving the dynamos at night, is to be derived from the river; and the principal object in thus combining two distinct schemes is to enable the water power of the river, which is at present running waste, to be utilized for the benefit of the inhabitants. The total cost of the works is estimated at £20,000.

The Capital Expenditure of the Manchester Corporation Gas Department.—The estimate of the expenditure on capital account of the Manchester Corporation Gas Committee for 1896-7 is £157,800, of which £106,100 is for extensions of stations, street-mains, &c., and £51,700 for additional buildings, machinery, and mains in connection with electric lighting.

The Water-Works Purchase Question at Portsmouth.—At a meeting of the Portsmouth Town Council a few days ago, reference was made by the Mayor to a proposal to offer £45,000 to the Water Company for their undertaking. He said the Council had already discussed the matter in all its bearings in Committee; and there had been for some years a general feeling in the city that the works ought to belong to the Corporation. The city owed a deep debt of gratitude to those who undertook the water supply; but as the undertaking had turned out a financial success, the shareholders could not be expected to surrender their property at cost price. He believed the sum of £45,000 was fair; and he moved that it be offered to the Company. Mr. Buchan seconded. Several members spoke upon the question; and, in the course of the discussion, it was stated that, in addition to the £45,000, the sum of £3000 would have to be spent on repairs and extensions of the engine power. The motion was carried.

Opening of New Water-Works at St. Austell.—The new water-works for the town of St. Austell were opened last Thursday. Hitherto the supply has been inadequate in quantity, and at too low a level to reach the higher parts of the town. The new scheme promises to be free from both these objections. The source of the supply is some half dozen springs which issue from the granite formation at Carne Stentes, two miles from St. Austell. The water is collected in a receiving-tank, and flows thence through a 7-inch main to two filter-beds and a reservoir at Trenance, 1¼ miles distant. The reservoir, which is of cement and covered, has a capacity of 800,000 gallons. A continuance of the 7-inch main takes the water to the town. The daily average yield of the springs in dry weather is 230,000 gallons, or equal to 70 gallons per head per day for the present population; and as the old supply is also retained, there is ample for a very long time to come. The new reservoir is about 100 feet above the level of the highest part of the town. The total cost of the works is £5200. Mr. John Sambell, the Engineer and Surveyor of the District Council, prepared the plans and superintended the execution of the work, which was carried out by Messrs. A. Delbridge and Son, of Camborne. The ceremony of turning on the water was performed by Mrs. Arthur Coode, the wife of the ex-Chairman of the District Council. Mr. H. Hodge, the Chairman of the Water Committee, stated that they had carried out the cheapest scheme of water supply in Cornwall. Mr. S. Trevail, the Chairman of the Sanitary Committee of the County Council, stated that during the past five years no less than 37 places in Cornwall had provided themselves with supplies of pure water.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST (see ante, p. 910).

Issue. £	Share.	When ex-Dividend.	Dividend or Interest & Bonus. p. c.	NAME. GAS COMPANIES.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment. £ s. d.
590,000	10	15 Apl.	10½	Alliance & Dublin 10 p. c.	24½–25½*	..	4 2 4
100,000	10	,,	7½	Do. 7 p. c.	17–18*	..	4 3 4
300,000	100	2 Jan.	5	Australian (Sydney) 5% Deb.	109–111	+1	4 10 1
200,000	10	16 Oct.	4	Belgrano (B. Ayres), Limited	8½–9½	..	4 4 3
100,000	Stck.	30 Dec.	5	Do. 5 p. c. Deb. Stk	95–100	..	5 0 0
200,000	5	14 Nov.	6½	Bombay, Limited	7¼–7⅝	..	4 3 10
40,000	5	,,	6½	Do. New, £4 paid	5½–5¾	..	4 10 3
380,000	Stck.	27 Feb.	12	Brentford Consolidated	280–285	..	4 4 3
210,000	,,	,,	9	Do. New	217–222	..	4 1 0
50,000	,,	,,	5	Do. 5 p. c. Pref.	—	..	—
159,375	,,	16 Dec.	4	Do. 4 p. c. Deb. Stock.	127–132	..	3 0 7
220,000	Stck.	27 Mar.	11	Brighton & Hove Original	232–237	..	4 12 10
208,820	,,	,,	8	Do. A Ord. Stk.	187–192	+5	4 3 4
933,500	Stck.	27 Feb.	5	Bristol, 5 p.c. max.	127–132	..	3 15 9
420,000	20	27 Mar.	11½	British	55–57	..	3 18 11
50,000	10	12 Mar.	11½	Bromley, Ordinary 10 p. c.	22½–23½	..	4 17 10
71,000	10	,,	8½	Do. 7 p. c.	19–20	..	4 5 0
500,000	10	14 Nov.	5†	Buenos Ayres (New) Limited	9¼–9⅝	–¼	5 2 7
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	102–104	..	5 15 5
150,000	20	27 Feb.	8½	Cagliari, Limited	29–31	..	5 6 5
100,000	10	27 Sept.	8†	Cape Town & District, Ltd.	14–15	..	5 6 8
50,000	50	2 Nov.	6	Do. 6 p. c. 1st Mort.	58–60	..	5 0 0
550,000	Stck.	15 Apl.	13½	Commercial Old Stock	330–340*	+2½	3 19 5
165,000	,,	,,	10½	Do. New do.	255–260*	..	4 0 9
165,000	,,	16 Dec.	4½	Do. 4½ p. c. Deb. do.	147–152	..	2 19 2
800,000	Stck.	16 Dec.	13	Continental Union, Limited.	283–287	..	4 10 7
200,000	,,	,,	10	Do. 7 p. c. Pref.	217–222	..	4 10 1
51,620	Stck.	27 Feb.	14	Croydon Com'cial A 10 p. c.	—	..	—
157,500	,,	,,	11	Do. B 7 p. c.	—	..	—
535,000	Stck.	27 Feb.	5½	Crystal Palace Ord. 5 p.c. Stk	130–135	..	3 17 9
60,000	,,	,,	5	Do. 5 p. c. Pref.	—	..	—
486,090	10	30 Jan.	11	European, Limited	26–27	..	4 1 6
354,060	10	,,	11	Do. £7 10s. paid	17½–18½	..	4 9 3
5,746,590	Stck.	13 Feb.	12¾	Gaslight & Coke, A, Ordinary	303–308	+1	4 2 9
100,000	,,	,,	4	Do. B, 4 p. c. max.	108–113	..	3 10 9
665,000	,,	,,	10	Do. C, D, & E, 10 p. c. Pf.	295–300	..	3 6 8
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	145–150	+5	3 6 8
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	210–215	+5	3 9 9
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	202–207	+2	3 7 8
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	290–295	..	3 7 10
476,000	,,	,,	6	Do. K, 6 p. c. Prf.	168–172	..	3 9 8
1,061,150	,,	16 Dec.	4	Do. 4 p. c. Deb. Stk.	138–142	..	2 16 4
294,850	,,	,,	4½	Do. 4½ p. c. do.	148–153	..	2 18 9
908,000	,,	,,	6	Do. 6 p. c. do.	204–209	..	2 17 5
70,000	10	30 Oct.	6	Hongkong & China, Limited	13–14	..	4 5 8
3,800,000	Stck.	14 Nov.	12	Imperial Continental	255–260	+2	4 12 4
376,400	100	1 Feb.	4	Do. 4 p. c. Debs. Red.	100–103	..	3 17 8
473,600	Stck.	13 Feb.	3½	Do. 3½ p. c. Deb. Stk	108–110	..	3 3 8
75,000	5	16 Dec.	6	Malta & Mediterranean, Ltd.	6¼–6⅝	+⅛	4 8 11
560,000	100	1 Apl.	5	Met. of Melbourne, 5 p. c. Deb.	113–116	..	4 6 2
250,000	100	,,	4½	Do. 4½ p. c. Debs.	107–109	..	4 2 7
541,920	20	14 Nov.	5	Monte Video, Limited	17½–18½	+½	5 8 1
150,000	5	28 Nov.	8	Oriental, Limited	8¼–8¾	..	4 11 5
135,000	5	,,	8	Do. New, £4 10s. paid	7¼–7⅝	..	4 12 10
15,000	5	,,	8	Do. do. 1879, £1 paid	1¾–2	..	4 0 0
60,000	5	12 Mar.	7	Ottoman, Limited	4⅞–5¼	..	6 13 4
166,870	10	—	2	Para, Limited	1–1½	..	—
420,000	100	2 Nov.	6	People's Gas } 1st Mtg. Bds.	105–110	..	5 9 1
500,000	100	9 Dec.	6	of Chicago } 2nd Do.	100–105	..	5 14 3
250,000	10	27 Mar.	8	San Paulo, Limited	13½–14½	..	5 10 4
500,000	Stck.	13 Feb.	15½	South Metropolitan, A Stock	395–405	..	3 16 6
1,350,000	,,	,,	12	Do. B do.	315–320	..	3 15 0
310,000	,,	,,	13	Do. C do.	330–340	..	3 16 6
800,000	,,	16 Jan.	5	Do. 5 p. c. Deb. Stk.	175–178	..	2 16 2
60,000	Stck.	12 Mar.	11½	Tottenham & Edmonton, A	250–255	..	4 10 2
60,200	,,	,,	8½	Do. B	—	..	—
170,383	10	30 Dec.	10	Tuscan, Limited	13½–14½	..	6 18 0
149,900	10	2 Jan.	5	Do. 5 p. c. Debs. Red.	100–102	..	4 18 0

WATER COMPANIES.

746,021	Stck.	30 Dec.	10½	Chelsea, Ordinary	328–333	+3	3 1 6
150,000	,,	,,	5	Do. 5 p. c. Pref.	170–175	..	2 17 1
160,000	,,	,,	4½	Do. 4½ p. c. Pref. Stk., 1875	—	..	—
175,783	,,	27 Mar.	4½	Do. 4½ p. c. Deb. Stock	155–160	..	2 16 3
1,719,514	Stck.	15 Apl.	7	East London, Ordinary	245–250*	..	2 16 0
654,740	,,	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	155–160	..	2 16 3
100,000	,,	,,	3	Do. 3 p. c. Deb. Stk.	105–107	..	2 16 1
700,000	50	16 Dec.	6½	Grand Junction, 10 p.c. max.	124–128	–1½	2 10 8
280,000	Stck.	27 Mar.	4	Do. 4 p. c. Deb. Stk.	148–152	..	2 12 8
708,000	Stck.	13 Feb.	12	Kent	335–340	..	3 10 7
160,000	,,	,,	7	Do. New, 7 p. c. max.	207–212	..	3 6 0
1,043,800	100	30 Dec.	7½	Lambeth, 10 p. c. max.	275–280	..	2 11 8
406,200	100	,,	7½	Do. 7½ p. c. max.	227–232	..	3 2 6
330,000	Stck.	27 Mar.	4	Do. 4 p. c. Deb. Stk.	147–152	..	2 12 8
500,000	100	13 Feb.	12¾	New River, New Shares	427–432	..	2 19 0
1,000,000	Stck.	30 Jan.	4	Do. 4 p. c. Deb. Stk.	153–158	..	2 10 8
902,300	Stck.	16 Dec.	6	S'thwk & V'xhall, Ordinary	168–173	..	3 9 5
126,500	100	,,	6	Do. Do. 7½ p. c. Max.	155–165	..	3 12 9
489,200	Stck.	,,	5	Do. Do. 5 p. c. Pref.	168–173	..	2 17 9
1,019,585	,,	15 Apl.	4	Do. 4 p. c. A Deb. Stk.	147–152*	..	2 12 8
1,155,066	Stck.	16 Dec.	10	West Middlesex	318–323	+5	3 1 10
200,000	,,	,,	4½	Do. 4½ p. c. Deb. Stk.	155–160	..	2 16 3

*Ex div.

† Next dividend will be at this rate.

Inauguration of Gas Lighting at Southwick (Sussex).—To celebrate the lighting of the town by gas, a dinner was given at the Schooner Hotel, Southwick, last Thursday evening. Mr. A. Braizer, the Chairman of the District Council, presided; and there was a large and influential gathering. The Chairman said that 50 lamps, fitted with incandescent burners, had been already erected, and an agreement entered into with the Brighton and Hove Gas Company to supply gas at the current rate charged in the district; the Council to pay the Company according to the indices of five metered lamps, and the Company to keep the lamps clean and in order, and to light and extinguish them, at a charge of 15s. per lamp per annum. Prior to the Council visiting West Tarring and seeing the incandescent gas lighting at that place, the electric light was favoured.

The Capacity of Closet Flushing Cisterns.—As mentioned in the article on "Water and Sanitary Affairs" last week, the Local Government Board have decided not to alter the existing regulations in regard to the capacity of water-closet flushing-cisterns. It will be remembered that the London County Council applied to the Board to institute an inquiry into this matter, principally with respect to a suggested amendment of Regulation 21 under the Metropolis Water Act, 1871, so that it should stand as follows: "Every water-closet cistern or water-closet service-box hereafter fitted or fixed, in which water supplied by the company is to be used, shall have an efficient waste-preventing apparatus so constructed as not to be capable of discharging more than three gallons of water at each flush." It was estimated that the difference of a gallon would mean an increase of 10 or 12 million gallons of water daily for the Companies to supply. The inquiry was held by Colonel Ducat, R.E., towards the close of last year; and upon his report, which has lately been issued, the decision of the Board has been based.

The Progressives and the London Water Question.—Mr. R. K. Causton, M.P., presided last Thursday evening, at the Memorial Hall, Farringdon Street, over a meeting of representative Progressive workers, convened by the London Liberal and Radical Union, to consider the present position of the London Water Question. Mr. Dickinson moved—"That this meeting is of opinion that the water supply in the Administrative County of London should be controlled by the directly-elected representatives of the London consumers; and that the purchase price of the water undertakings should not be assessed under the provisions of the Lands Clauses Consolidation Act, but should be based upon the fair and reasonable value of those undertakings; due regard being had to the rights, special circumstances, and obligations of the Companies. This meeting accordingly condemns the action of the Government in supporting the extreme claims of the Water Companies as to compensation, involving an addition of many millions to the cost of purchase; and also the proposal of the Government to create a Water Board which would not be controlled by the London consumers." Mr. T. M'Kinnon Wood seconded the motion; and it was carried unanimously.

Fatal Accident at the Bristol Gas-Works.—Last Wednesday, Dr. E. M. Grace, the Coroner for the Lower Division of Gloucestershire, held an inquest on the body of William Keeling, 56 years of age, a labourer in the employ of the Bristol Gas Company. The evidence showed that the previous day Keeling and another labourer named Dooling, who were engaged at the Stapleton works of the Company, were removing one of the beds of retorts, when, the keystone of the arch falling away, the structure collapsed. Keeling and Dooling were unable to get clear. Assistance was at hand, and the *débris* was promptly removed. Dr. Hall, who was driving past just about the time, was called in. Keeling, however, was past human aid; the injuries to the head being of a shocking character. Dooling was more fortunate; but his injuries were such that he was detained at the Royal Infirmary. The jury returned a verdict of "Accidental death."

The Coal Trade Conciliation Board.—Mr. S. Woods presided at a special meeting of the Lancashire and Cheshire Miners' Federation, held in Manchester last Saturday, for the purpose of receiving reports from the districts as to the proposals submitted by the coal-owners' and miners' representatives to an informal meeting of the Conciliation Board on the 26th ult. It was reported that the whole of the fourteen districts in the federation were unanimously in favour of the men's proposal that the agreement now in existence should be continued until Aug. 1, 1898. The following resolution was then agreed to with unanimity: "That this meeting of Lancashire and Cheshire miners is in favour of a renewal of the agreement entered into by the Board of Conciliation in July, 1894; that the agreement continue two years longer, and operate as before; that the rate of wages remain as at present until January, 1898; and from January to Aug. 1, 1898, the Board of Conciliation to have full power to advance wages, as the existing agreement provides for, up to 15 per cent. higher than the present rate."

Water Supply in the Stockport District.—A conference of local urban authorities, convened by the Heaton Norris District Council, has been held at Stockport, to consider the question of the high charges and low pressure of water supplied by the Stockport Water Company. There were representatives at the meeting of the Stockport Corporation, Stockport Property Owners' Association, and the District Councils of Heaton Norris, Alderley Edge, Bosden, Norbury, Bramall, Wilmslow, and Handforth. Mr. Edwin Barton gave a brief history of the Company and the Act of Parliament under which they had distributing powers. The Act, he said, was over thirty years old; and this fact, together with the enormous growth of the town and district, rendered an amending Act or a more generous treatment of the ratepayers an absolute necessity. Mr. Barton gave a list of the water charges made in 106 towns in England and Scotland, and stated that in 100 of these cases the charges did not exceed 1s. in the pound on houses of an average rental of £20, while the Stockport Company's rate was 1s. 6d. The charges in the localities referred to varied from 2d. to 10d. in the pound. The conference appointed a Sub-Committee.

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	High.	Wide.	Deep.	High.	Wide.	Deep.				
401	18½	13½	11½	14	11	9½	13½ by 11½	1	28/6	—
402	24½	15½	15	18	11	11	15½ ,, 15	2	40/-	2/6
403	30	18	17	19	11	11	18 ,, 17	2	45/-	2/6
404	30	18	17	19	13½	11	18 ,, 17	2	50/-	2/6
404	If fitted with Enamelled-Lined and Jacketted Door and Fire-Brick Crown, as adopted by The London Gaslight and Coke Co.								55/-	2/6

Any of these Cookers, except No. 401, can be fitted with Griller at an extra charge of 2/6; but the adoption of the Griller is not recommended for use with Prepayment Meters.

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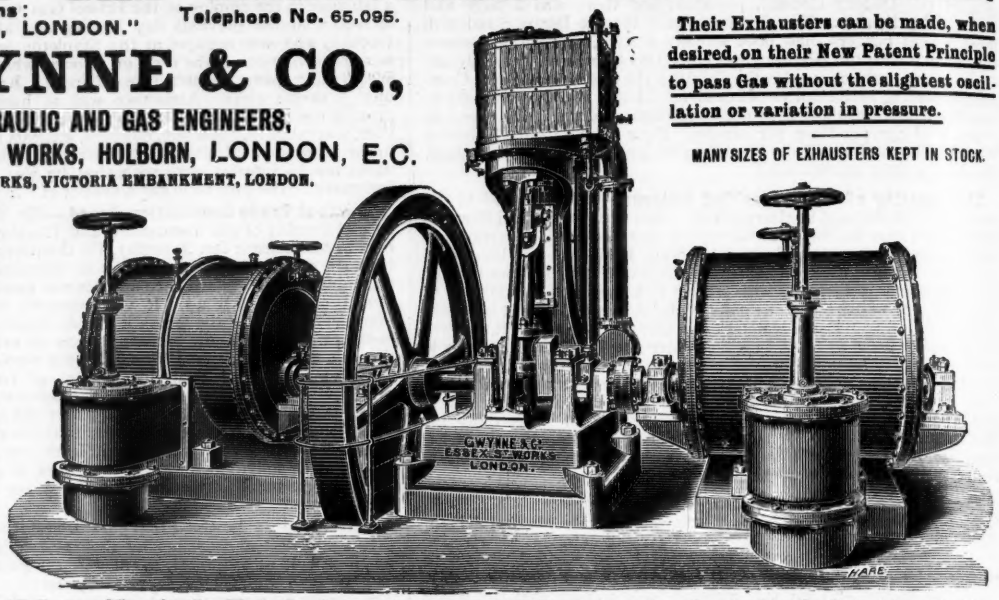

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Salary, £300 per annum, with House, Coal, and Gas.
Preference will be given to one having experience of Stoking Machinery.
Applications, stating Age and accompanied by not more than three Testimonials of recent date, addressed to the Chairman of the Gas Committee, Municipal Buildings, Leeds, will be received not later than Wednesday, the 20th of May, endorsed "Gas Manager."
R. H. TOWNSLEY,
General Superintendent.
April 25, 1896.

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APPOINTMENT OF GAS MANAGER.

THE Corporation of Chorley are pre-pared to receive APPLICATIONS for the appointment of ENGINEER and MANAGER of their Gas-Works. The Gentleman appointed will be required to devote the whole of his time to the discharge of the Duties of his Office, and to enter into a bond in the Sum of £200 for the due performance of such duties. The duties do not include the collection of Gas-Rents, &c.
The Salary will be £200 per annum, clear of all Expenses.
Canvassing Members of the Council, either directly or indirectly, is strictly prohibited.
Applications, stating Age, and previous Employment, accompanied by not more than three recent Testimonials, to be sent to me on or before Tuesday, the 12th of May, 1896.
By order,
JNO. MILLS,
Town Clerk.
Town Hall, Chorley,
April 25, 1896.

WANTED, by a Gas Company in Derby-shire, making about 4½ to 5 Million Cubic Feet per Annum, a WORKING MANAGER, with a thorough practical knowledge of, and accustomed to, the routine of a small Gas-Works. Must be a good Carbonizer, with a knowledge of the Working and Setting of Clay Retorts. Able to take Meter Indices, lay Mains and Services, work Exhausting Machinery, and take charge of the Works in general.
Wages, 30s. per Week, with House, Fuel, and Light free.
Applications, in applicants' own handwriting, stating Experience, Age, if Married or Single, accompanied by two *copies* of Testimonials of recent date, which will not be returned (originals can be sent when asked for), to the undersigned not later than the 4th day of May next ensuing; and none but those whose antecedents will bear strict investigation need apply.
Notice will be given in the "JOURNAL" when the appointment is made.
C. E. JONES,
Consulting Engineer,
Chesterfield.
Chesterfield, April 24, 1896.

WANTED, a Purifier, about 8 ft. by 6 ft. by 3 ft.; two 6-inch FOUR-WAY VALVES; and STATION GOVERNOR (6-inch).
GAS-WORKS, Stevenston, AYRSHIRE.

WANTED, a good second-hand Gas-HOLDER, about 35 to 40 feet diameter, and 16 or 18 feet deep, with Steel, Wrought-Iron, or Cast-Iron Tank.
Apply, stating lowest Price, to No. 2651, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, to purchase, 90's and 50/90's BENZOL.
Apply, with Prices, &c., to No. 2656, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ADVERTISER has a small parcel of about 10 Tons of SULPHATE OF AMMONIA, of good colour, FOR SALE within 10 Miles of London.
Buyers address No. 2655, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—24 five-inch H and Dip PIPES. Also a 5000 cubic feet per hour STATION METER, with 6-inch Connections.
For Particulars, apply to J. C. BENNETT, Gas-Works, BRIDGNORTH.

FOR SALE, very Cheap—One 6-inch Dry-Faced CENTRE-VALVE for Three PURIFIERS, two on and one off, in perfect order. Replaced by larger.
Apply to T. BURTONSHAW, Manager, Gas-Works, CHIPPING NORTON.

LEIGH URBAN DISTRICT COUNCIL.

THE Gas Committee of the Leigh Urban District Council invite TENDERS for INCLINED RETORTS and FIRE-CLAY MATERIALS.
Particulars may be obtained on application to the undersigned.
Sealed tenders, endorsed "Retorts," and addressed to the Chairman of the Gas Committee, to be delivered at the Town Hall, Leigh, not later than Monday, the 11th of May next.
The lowest or any tender not necessarily accepted.
ALFRED T. FLETCHER,
Engineer and Manager.
Gas-Works, Leigh, Lancs.,
April 25, 1896.

TENDER FOR TAR AND LIQUOR.

THE Directors of the Newmarket Gas Company are prepared to receive TENDERS for the surplus TAR and LIQUOR produced at their Works during the ensuing Twelve Months, ending March 31, 1897.
Tenders, stating Price per 1000 Gallons in Contractor's Tanks or Barrels, free on Rail at Newmarket, to be sent to the undersigned on or before the 2nd of May next, from whom any further Particulars may be obtained.
The Directors do not bind themselves to accept the highest or any tender.
By order,
J. H. TROUGHTON,
Secretary and Manager.
Gas-Works, Newmarket,
April 23, 1896.

TUNBRIDGE WELLS GAS COMPANY.

TO COAL FACTORS AND OTHERS.

THE Directors of the Tunbridge Wells Gas Company will be prepared on Tuesday, the 12th day of May next, to receive TENDERS for the supply of 18,000 Tons of either NEW PELTON, NEW TANFIELD, PELAW MAIN, EAST PONTOP, SOUTH HETTON, LONDONDERRY, NORTH PELAW, or other approved GAS COALS at the option of the Directors, to be delivered free into the Gas Company's Siding on the South-Eastern Railway at Tunbridge Wells, in accordance with Terms and Conditions, which may be obtained on application.
The tenders are to be sent to me by not later than Six o'clock p.m. on Tuesday, the 12th day of May, marked "Tender for Coals."
The lowest or any tender will not necessarily be accepted.
By order,
JOHN READ,
Secretary and General Manager.
Gas Company's Office,
Tunbridge Wells.

GUILDFORD GASLIGHT AND COKE COMPANY.

TO TAR AND LIQUOR DISTILLERS.

THE Directors of the above Company are prepared to receive TENDERS for the surplus TAR and LIQUOR produced by the above Company for the Year ending the 30th of June, 1897. Coal carbonized about 12,000 tons per annum.
All tenders to state the Price per Cask of 40 Gallons, and in matter of Liquor to state the Price, per Ounce Strength by the Distillation Test and per Degree Twaddel.
Cartage to and from Railway Station, Guildford, free. All empties to be provided by Contractor.
Tenders, endorsed "Tar" or "Liquor," to be sent to Mark Smallpeice, Esq., Chairman of the Gas Company, Guildford, on or before Monday, the 11th of May, 1896.
By order,
R. T. SIMPSON,
Secretary.
Gas Offices, Guildford,
April 25, 1896.

GUILDFORD GASLIGHT AND COKE COMPANY.

TO COAL MERCHANTS.

THE Directors of the above Company are prepared to receive TENDERS for the supply of 16,000 to 20,000 Tons of DURHAM GAS COAL, to be delivered free at Guildford Station during the period of Two Years from the 1st of July, 1896, to the 30th of June, 1898, in such quantities and at such times as required.
The Directors reserve the right to accept the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any tender.
Tenders to be endorsed "Tender for Coal," and to be sent to Mark Smallpeice, Esq., Chairman of the Company, Guildford, on or before Monday, the 11th of May, 1896.
By order,
R. T. SIMPSON,
Secretary.
Gas Offices, Guildford,
April 25, 1896.

AMMONIACAL LIQUOR FOR SALE.

THE Directors of the Town of Dudley Gaslight Company invite TENDERS for the AMMONIACAL LIQUOR produced at their Works during the Year commencing the 1st of July next, loaded into Buyer's Boats at Blowers Green Wharf.
Quantity, about 400,000 Gallons.
Sealed tenders, addressed to the Chairman, and endorsed "Tender for Ammoniacal Liquor," to be sent in not later than the 5th of May.
The Directors do not bind themselves to accept the highest or any tender.
By order,
T. E. STILLARD,
Secretary.
Gas-Works, Dudley,
April 25, 1896.

TENDERS FOR COAL.

THE Directors of the Town of Dudley Gaslight Company are prepared to receive TENDERS for the supply of 12,000 Tons of GAS COAL, to be delivered at the London and North-Western Railway or Great Western Railway Sidings, Dudley, in such quantities as may be required from the 1st of July, 1896, to the 30th of June, 1897.
Sealed tenders, addressed to the Chairman, and endorsed "Tender for Coal," to be sent in not later than the 5th of May.
The Directors do not bind themselves to accept the lowest or any tender, and reserve to themselves the right to divide the contract between two or more firms.
By order,
T. E. STILLARD,
Secretary.
Gas-Works, Dudley,
April 25, 1896.

THE Corporation of Middleton are pre-pared to receive TENDERS for the GAS COAL and CANNEL required at their Gas-Works during the ensuing Year, delivered at the Middleton Railway Station, free of carriage.
Tenders, addressed to the Chairman of the Gas Committee, to be delivered at my Office on or before the 20th of May, 1896, endorsed "Tender for Gas Coal" or "Cannel," as the case may be.
Further Particulars and Form of Tender may be obtained from Mr. Duxbury, Gas Manager.
The Corporation do not bind themselves to accept the lowest or any tender.
FREDERICK ENTWISTLE,
Town Clerk.
Town Clerk's Office, Middleton,
April 22, 1896.

KEIGHLEY CORPORATION.

TO IRONFOUNDERS AND OTHERS.

THE Gas-Works Committee are pre-pared to receive TENDERS for the supply and erection of CAST-IRON TAR and LIQUOR STORE-TANKS.
Specifications and Drawings can be seen at the Gas Offices, Low Bridge, Keighley, where also Form of Tender and Bill of Quantities can be obtained for the same.
Sealed tenders, endorsed "Tender for Tar-Tank," addressed to the Chairman of the Gas Committee, must be sent to the undersigned not later than Monday, the 4th of May.
The Committee do not bind themselves to accept the lowest or any tender.
By order,
JOHN LAYCOCK,
Engineer and Manager.
Low Bridge, Keighley,
April 22, 1896.

CORPORATION OF NOTTINGHAM.
(GAS DEPARTMENT.)

TENDERS FOR COALS.

THE Gas Committee are desirous to receive OFFERS for supplies of COALS COBBLES, or NUTS, for the period terminating the 30th of June, 1897.
The Large Coals and the Cobbles or Nuts are to be separately delivered, where and as from time to time directed, by and at the expense of the Contractors, upon the Gas-Works Siding, Great Northern Railway, in the East Croft at Nottingham, and also on the Gas-Works Sidings, Midland Railway, at Radford and Basford respectively; and at and after the rate of one-eighth part of such total quantity in each Calendar Month, commencing with the month of July next, till the Corporation shall be satisfied with the amount of accumulated Stock, and afterwards at such rate as shall be from time to time directed, till the agreed quantity shall have been delivered.
The Coals, Cobbles, or Nuts are to be the best of their respective kinds, freshly wrought and WELL SCREENED (description, sizes, and inclination of Screen to be specified), to be as free as possible from Sulphur, Bats, Bind, Refuse, and Dirt, and shall be weighed (20 cwt. to the Ton) upon the Corporation Machines, or upon such other Machines as may be mutually agreed upon.
Payments will be made monthly, if and so long as the contract shall be duly fulfilled.
The Corporation do not bind themselves to accept the lowest or any tender.
Further Information and Forms on which the tenders must be made, may be obtained on application to me, at the General Manager's Office; and the tenders (sealed), specifying the description of Coals, the Seam, and the Pits at which they are to be raised, and stating the Prices for deliveries at the several places and in manner and subject to the conditions aforesaid, must be delivered to SIR SAMUEL GEORGE JOHNSON, KT., TOWN CLERK, on or before Saturday, the 2nd day of May, 1896.
By order,
WILLIAM REGINALD CHESTER,
Engineer and General Manager.
Corporation Gas Offices, George Street,
Nottingham, April 23, 1896.

TENDERS FOR TAR.

THE Derby Gaslight and Coke Company are prepared to receive TENDERS for the purchase of the surplus TAR they will have for disposal during the Twelve Months ending March 31, 1897.

Further Particulars on application to the undersigned.

Tenders must be addressed to the Chairman of the Finance Committee of the Derby Gaslight and Coke Company, Friar Gate, Derby, endorsed "Tender for Tar," and delivered on or before April 30 next.

By order,
RICHARD FISHER, Secretary.

Gas Office, Derby,
April 15, 1896.

LIVERPOOL UNITED GASLIGHT COMPANY.

THE Directors of the Liverpool United Gaslight Company are prepared to receive TENDERS for the supply of 83,000 Tons of CANNEL and 75,000 Tons of COAL, to be delivered at the various Works of the Company, during the period of Twelve Months between the 1st of July, 1896, and the 30th of June, 1897.

Tenders will be received for the whole or any portion of the above quantity.

The Directors reserve the right to accept tenders for the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any tender.

Full Particulars and printed Forms of Tender can be obtained, on application to the undersigned, at the Gas Office, Duke Street, Liverpool, to whom Tenders (on the printed form only) must be delivered at or before Ten a.m., on Monday, the 4th of May, endorsed "Tender for Cannel and Coal."

By order,
WILLIAM KING,
Engineer.

Gas Office, Duke Street, Liverpool,
April 9, 1896.

SHEFFIELD UNITED GASLIGHT COMPANY.

TO IRON ROOF AND GIRDER CONTRACTORS.

THE Directors of this Company invite TENDERS for the supply and erection of IRON ROOF, together with Girder and Column to carry the same, for Boiler-House at their Grimesthorpe Station.

The Roof is 54 feet long by 65 feet wide.

Drawings may be seen, and Specification with Bill of Quantities and Form of Tender obtained, on application to the Engineer, Mr. Fletcher W. Stevenson, on payment of 10s. 6d., which will be returned on receipt of *bonâ-fide* tender.

Sealed tenders, endorsed "Tender for Iron Roof," must be delivered by post to the undersigned, at the Company's Offices, not later than first post on Monday, the 4th day of May.

The Directors do not bind themselves to accept the lowest or any tender.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
April 16, 1896.

SHEFFIELD UNITED GASLIGHT COMPANY.

TO MAKERS OF DEEP WELL PUMPS.

THE Directors of this Company invite TENDERS for the supply and erection of a pair of DEEP WELL PUMPS, to lift 10,000 Gallons of Water per Hour from a depth of about 65 feet below ground level, and force to a height of 70 feet above ground level.

Further Particulars and Plan of the Site of Well may be obtained on application to the Engineer, Mr. Fletcher W. Stevenson, and upon payment of 10s. 6d., which will be returned on receipt of *bonâ-fide* tender.

Sealed tenders, endorsed "Tender for Pumps," must be delivered by post to the undersigned, at the Company's Offices, not later than first post on Monday, the 4th day of May.

The Directors do not bind themselves to accept the lowest or any tender.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
April 17, 1896.

HOYLAKE AND WEST KIRBY GAS AND WATER COMPANY, LIMITED.

THE Directors of the above-named Company are prepared to receive TENDERS for the supply of about 1700 (One Thousand Seven Hundred) Tons, more or less, of GAS COAL. Delivery to extend as required from the 1st of July next to the 30th of June, 1897. Price to include delivery on Gas-Works Siding, Hoylake.

Tenders are also invited for the supply of about 200 (Two Hundred) Tons, more or less, of STEAM COAL, and 100 (One Hundred) Tons, more or less, of WASHED SLACK. Delivery to extend as required from the 1st of July next to the 30th of June, 1897. Price to include delivery on Rails at West Kirby Station.

The Directors reserve the right to accept tenders for the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any tender.

Sealed tenders, marked "Tender for Coal," must be delivered to the undersigned not later than Nine a.m., on Wednesday, the 13th day of May next.

Printed Forms of Tender will be forwarded by post upon application in writing.

TENDERS are also invited for the purchase of any surplus TAR and AMMONIACAL LIQUOR that may be for disposal at Hoylake Gas-Works during the Year ending the 30th of June, 1897.

The Directors will not necessarily accept the highest or any tender.

Form of Tender optional.

Tenders, to be endorsed "Tender for Tar, &c.," must be delivered to the undersigned not later than Nine a.m., on Wednesday, the 13th day of May next.

By order,
ARTHUR GEO. READDY,
Secretary.

8, Filey Terrace, Hoylake,
April 25, 1896.

WHITTINGTON GAS COMPANY, LIMITED.

GASHOLDER TANK.

THE Directors of the above Company are prepared to receive TENDERS for a BRICK and PUDDLE TANK, 61 ft. 6 in. in diameter and 20 feet deep, to be constructed at their Works at Whittington, near Chesterfield, Derbyshire.

Drawings and Specification may be seen at the London Offices of the Company, 85, Gresham Street, Guildhall, E.C., on application to the Secretary.

Tenders, to be addressed to the Secretary as above, and marked "Tender for Tank," must be sent in not later than Thursday morning, the 7th of May.

The Directors do not bind themselves to accept the lowest or any tender.

(Signed) A. H. CÆSAR, Secretary.

TO GAS ENGINEERS AND CONTRACTORS.

TENDERS are invited for the construction of four STEEL PURIFIERS, Centre-Valve, Connections, and Lifting Apparatus, at the Abergavenny Gas-Works.

No Plans or Specifications supplied; but Contractors are to submit their own Plans and Specifications with their tenders. The latter will be returned to unsuccessful Contractors.

It is essential that Contractors should view the Site; and the tender of any Contractor failing to inspect the Site will not be entertained.

Tenders, with Plans and Specifications, in sealed cover, to be delivered to the undersigned not later than Thursday, the 14th of May, 1896.

The lowest or any tender not necessarily accepted.

J. T. RUTHERFORD,
Clerk, Abergavenny
Urban District Council.

Town Hall, Abergavenny,
April 22, 1896.

TENDERS FOR GAS COAL.

THE Brentwood Gas and Coke Company invite TENDERS for the supply of about 4000 Tons of screened GAS COAL in Trucks at Brentwood Railway Station (G.E.R.), at per ton, to be delivered in the following quantities the second week of each month: June, 140 Tons; July, 160 Tons; August, 200 Tons; September, 400 Tons; October, 450 Tons; November, 500 Tons; December, 560 Tons; January, 500 Tons; February, 350 Tons; March, 300 Tons; April, 250 Tons; May, 190 Tons.

Tenders (with Analysis of the Coal to be supplied), and Terms for monthly payments, to be sent to the undersigned, on or before May 2.

The Directors do not bind themselves to accept the lowest or any tender.

C. A. FIELDER,
Secretary.

Brentwood, Essex,
April 17, 1896.

TAMWORTH GASLIGHT AND COKE COMPANY.

THE Directors of the Tamworth Gaslight and Coke Company are prepared to receive TENDERS for the supply of 2600 Tons of best screened GAS COAL, to be delivered at Tamworth Station, Midland or L. & N. W. Railway, from July 1, 1896, to June 30, 1897.

Tenders may also be given for a Two Years' Supply.

Forms of Tender and further Information may be obtained on application to the Manager.

Tenders, endorsed "Tender for Coal," must be sent to the undersigned by May 23, 1896.

The Directors reserve the right to accept tenders for the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any tender.

By order,
W. A. SAFEY,
Manager and Secretary.

Gas-Works, Tamworth,
April 24, 1896.

ISSUE OF STOCKS AND SHARES BY AUCTION UNDER PARLIAMENTARY POWERS.

MR. ALFRED RICHARDS undertakes the issuing by Auction of GAS AND WATER SHARES under Parliamentary Powers.

He also holds MONTHLY SALES of GAS AND WATER SHARES at the Auction Mart, Tokenhouse Yard, E.C.

Terms for the issuing of Capital, and also for offering to auction Gas and Water Shares, and all Particulars relating thereto, may be had of Mr. Alfred Richards.

Offices: 18, FINSBURY CIRCUS, E.C.

By Order of the Directors of the Aldershot Gas and Water Company (New Issue of Capital), and by Order of various other Owners.

STOCKS AND SHARES

In the following Gas and Water Undertakings:—

Aldershot Gas and Water Company (New Issue of 135 Six per Cent. Preference Shares).
Brighton and Hove General Gas Company.
Broadstairs Gas Company.
West Ham Gas Company.
Worthing Gas Company.
Bournemouth Gas and Water Company.
Herne Bay Water-Works Company.
Tottenham and Edmonton Gaslight and Coke Company.
Harrow and Stanmore Gas Company.
West Kent Gas Company.
Clevedon Gas Company.
Southend Water Company.

MR. ALFRED RICHARDS will Sell the Above BY AUCTION, at the Mart, Tokenhouse Yard, E.C., on Monday, May 11, at Two precisely, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

TO MANUFACTURING CHEMISTS.

TAR AND AMMONIA WATER.

THE Directors of the Loughborough Gas Company are prepared to receive TENDERS for the surplus TAR and AMMONIA WATER, to be produced at their Works for One Year from the 30th day of June.

The estimated Quantities will be about 350 Tons of Tar, and 900 Tons of Ammonia Water. The Tar and Liquor to be delivered into the Contractor's Boats at the Wharf, on the Derby Road, Loughborough.

The Strength of the Liquor to be tested by Twaddel's Hydrometer (temperature 60°); and the tender to state the price per ton of 4° rising 2° up to 8°.

The Boats for the Removal of the Tar and Liquor to be sent at such times as may be required.

Payments, the 10th of following Month.

Further Information may be obtained on application to the undersigned, to whom tenders, in accordance with this Advertisement, must be sent not later than the 6th day of May next.

The Directors do not bind themselves to accept the highest or any tender.

J. B. BALL, C.E.,
Manager.

Loughborough,
April 24, 1896.

IMPORTANT SALE OF CHICHESTER GAS COMPANY'S SHARES.

TO BE SOLD, by Auction, by Messrs. WYATT AND SON, on Wednesday, the 20th of May, 1896, at the Dolphin Hotel, Chichester, at Three o'clock precisely, in 50 Lots, by order of the Directors of the City of Chichester Gas Company, FIVE HUNDRED £10 SHARES in the above Company, being the first portion of the Additional Capital authorized to be raised by the Chichester Gas Order, 1881. The Maximum Dividend authorized is 7 per cent.

Printed Particulars, with Conditions of Sale and full Information, may be obtained of Messrs. RAPER, FREELAND, and TYACKE, Solicitors, West Street, CHICHESTER; of ALFRED LASS, Esq., 30, Gracechurch Street, LONDON, E.C.; R. S. CHURCH, Esq., Secretary at the Company's Offices, the Gas-Works, CHICHESTER; and of Messrs. WYATT AND SON, Auctioneers and Valuers, East Street, CHICHESTER, HAVANT, and ARUNDEL.

Price 6s., Cloth Bound,

THE CHEMISTRY OF ILLUMINATING GAS.

By N. H. HUMPHRYS, Assoc. M.Inst.C.E., F.C.S.

This work contains chapters on: The Relative Cost of Light from Gas, Oil, and Candles; Products of Combustion; The Sulphur Question; The Composition of Illuminating Gas; Water Gas; Various Gas-Making Processes; Oil Gas; Properties of Fluid Hydrocarbons; Tar for Gas-Making; Destructive Distillation Condensation; and Purification.

WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

INCANDESCENT GAS LIGHTING.

NOTICE.

The Hon. Mr. Justice Wills having on Saturday, the 18th April inst., given Judgment in favour of our Clients the SUNLIGHT INCANDESCENT GAS-LAMP COMPANY in the Action brought against them by the Incandescent Gas-Light Company, and decided that our Clients' Mantles are NOT AN INFRINGEMENT OF THE WELSBACH PATENTS, we hereby call attention of the Shareholders, Patrons, and Customers of the Sunlight Incandescent Gas-Lamp Company and the Public generally to the fact that they may now trade with our Clients without fear of Litigation, and utterly regardless of the threatening Notices with which the Incandescent Gas Light Company has flooded the Press.

MADDISONS,

1, King's Arms Yard, London, E.C.,

Solicitors for the Sunlight Incandescent Gas-Lamp Company, Limited, the Defendants in the Action, whose Show-Rooms are at 79, Queen Victoria Street, London, E.C.

20th April, 1896.

CAUTION—The Sunlight Incandescent Gas-Lamp Company, Limited, must not be confounded with Another Company calling itself the "Evening" Sunlight Company, and with which it has no connection.

NOTICE.

The attention of the METEOR INCANDESCENT LIGHTING COMPANY, LIMITED, having been again called to the Advertisements inserted in various papers by the Incandescent Gas-Light Company, Limited, of Palmer Street, Westminster, to the effect that the "Meteor" Incandescent Gas-Lights are an Infringement of their Patents, and that they will bring Actions for Infringement against all persons found dealing in any manner with such Lights, the METEOR INCANDESCENT LIGHTING COMPANY, LIMITED, HEREBY GIVE NOTICE that they are advised that the "Meteor" Incandescent Lights in no way infringe any of the Patents of the Incandescent Gas-Light Company, Limited, that an Action has been commenced to restrain such threats, and that they are PREPARED TO FULLY INDEMNIFY ALL PURCHASERS, DEALERS, AGENTS, and USERS of their Lights against any Legal Proceedings on the part of the Incandescent Gas-Light Company, Limited.

WILSON, BRISTOWS, & CARPMAEL,
1, Copthall Buildings, London, E.C.,
Solicitors to the Meteor Incandescent Lighting Company, Limited, of 35, New Broad Street, London, E.C.

Nov. 30, 1895.

JUNKERS' CALORIMETER

SHOWS AT A GLANCE THE HEATING VALUE OF GAS.

NO BOMB. NO ANALYSIS.

See Illustrated Advertisement in the "JOURNAL" for April 14, (p. 786).

Reduced Price £15 15s.

HERMANN HÜHNE,
25-35, New Broad Street, London, E.C.

HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation.

Yield of Gas Per Ton . . 11,205 Cubic Feet.
Illuminating Power, 16 7/10 Stand. Sperm. Candl.
Coke (of good & pure quality) 13¾ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash . . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton . . 10,500 Cubic Feet.
Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . 13½ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash. . . . . 1·34 Per Cent.
Tar. . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 94½ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COAL-FIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE AND SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on Application.

LOW MOOR BLACK BED GAS COAL.

YIELD OF GAS PER TON - 10,375 CUBIC FEET.
ILLUMINATING POWER - 17·50 SPERM CANDLES.
COKE - - - - - - - - 75 PER CENT.

Prices, f.o.r. or f.o.b., on application to

GEORGE & JOHN HAIGH,
RAVENS LODGE AND CONYERS' COLLIERIES,
DEWSBURY.

A TRIAL IS RESPECTFULLY SOLICITED.

THORNLEY GAS COALS

WORKED BY THE

WEARDALE IRON & COAL Co., Ld.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON, *May 28, 1895.*

Yield of Gas per Ton . . 10,500 Cub. Ft.
Illuminating Power . . 16·9 Candles.
Coke (of good quality) . . 67·5 per Cent.
Sulphur . . . . . 0·58 ,,
Ash . . . . . 2·73 ,,

For Price, &c., apply to the

WEARDALE IRON & COAL Co., Ld.
QUAYSIDE, NEWCASTLE-ON-TYNE.

NEEDFUL NOTICE.

Our London Office for Visitors to the Metropolis is still

3 & 4, Lime Street Square, E.C.;

BUT

ALL COMMUNICATIONS MUST NOW BE ADDRESSED—

NEW CONVEYOR CO., LTD.,
TRANSPORT APPLIANCE WORKS,
SMETHWICK,
BIRMINGHAM.

Telegraphic Address: "APTITUDE, BIRMINGHAM."
Telephone No. 2050.

THE DRUM

FOR PUMPING AIR, WATER, SEMI-FLUIDS, &c.
See Advertisement in last and next issue.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For Particulars, Price, &c., apply to Mr. E. PRICE, Inventor and Patentee, 119, Queen's Road, FINSBURY PARK, N.

Prices are Reduced.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke. . . . . 68 per cent.

For prices, f.o.b. Ship or Delivered by Rail, apply to

THE WALLSEND & HEBBURN COAL COMPANY, LTD.,
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W. RICHARDSON, Fitter.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

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LIMITED,
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HUNTER'S

OXIDE OF IRON.

JAMES HUNTER, MINER, AND SHIPPER OF NATURAL IRISH BOG ORE.

This Estate yields the finest and most uniform quality in Ireland; and the quality is guaranteed,

Samples and Prices on application.

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MIRFIELD
BLACK BED GAS COAL.

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RAVENSTHORPE, NEAR DEWSBURY.

JAMES OAKES & Co.,

ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

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SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS,
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

INCANDESCENT GAS-LIGHT COMPANY, LIMITED,

v.

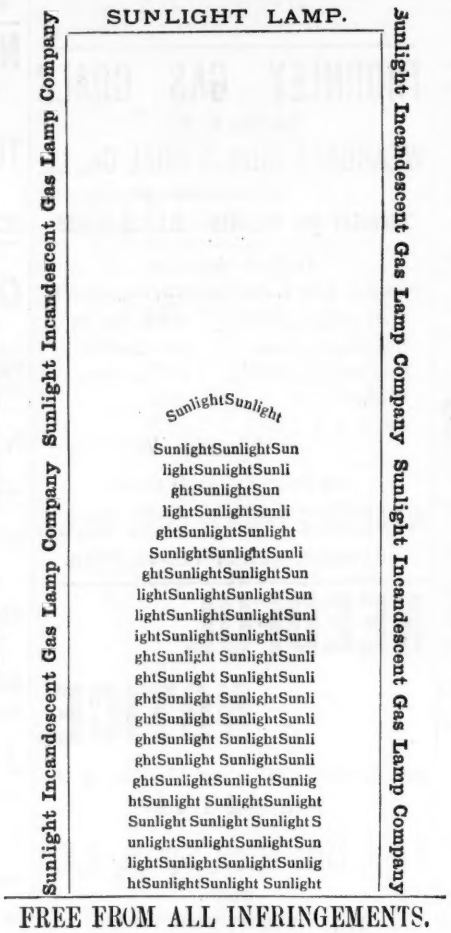
SUNLIGHT GAS-LAMP COMPANY, LIMITED.

JUDGMENT FOR SUNLIGHT COMPANY.

EXTRACTS FROM JUDGMENT.

"No use is made by the Defendants of any of the 'rare earths;' and their choice of substances and their method of applying the illuminants appear to me to be as wide asunder as the poles from those contemplated by Welsbach."

Welsbach "could make no use of the great strength and tenacity of alumina." "The Sunlight process uses alumina very largely indeed."



EXTRACTS FROM JUDGMENT.

Welsbach Company's Counsel "both admit that they have no case unless the Welsbach skeleton, of whatever resistant earth oxides composed, is within the Welsbach Patent. Mr. Terrell says the consequences of an adverse decision on this point are very grave. I am very sorry if they are so; but I cannot help it. It seems to me that this is just what Welsbach did not claim."

FREE FROM ALL INFRINGEMENTS.

Free from all Infringements.

STRONG RESISTANT MANTLE.

PURE SOFT LIGHT.

CHEAP MAINTENANCE.

Show-Rooms—

SUNLIGHT INCANDESCENT COMPANY, LIMITED,

79, Queen Victoria Street, E.C.

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Brettell's Estate
FIRE-CLAY & BRICK WORKS,
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Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
Shipments Promptly and Carefully Executed.

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Established 1862. **NEW GAS PLANT CEMENT**
For all Joints in connection with
SULPHATE PLANT. OIL-GAS PLANT. GAS. TAR. AMMONIA.
SAMPLES ON APPLICATION.
SPECIAL PAINTS FOR GAS-WORKS.
Telegrams "Enamel." Nat. Tel. 1759.
TRADE MARK.
John E. Williams & Co., *Victoria Paint Works,* **Manchester.**

BOLDON GAS COALS.
Worked by THE HARTON COAL CO., LTD.
Output about 3000 tons per day.

Analysis—

Yield of Gas per ton	10,500	Cubic Feet.
Illuminating Power	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Commercial Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Danish Gas Company, Bombay Gas Company, San Paulo Gas Company, Alliance and Dublin Consumers' Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For Prices, &c., apply to the
HARTON COAL COMPANY,
LIMITED,
Newcastle-on-Tyne.
W. H. PARKINSON,
Fitter.

THE SILICA FIRE-BRICK COMPANY,
OUGHTIBRIDGE, near SHEFFIELD,
MANUFACTURE
SILICA BLOCKS, BRICKS, AND CEMENT
OF SUPERIOR QUALITY
FOR GAS-FURNACES.
Trade Mark: "SILICA."
These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their
GREATER DURABILITY,
Strongly recommended where EXCESSIVE HEATS have to be maintained.

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3 & 4, Lime Street Square, E.C.;
BUT
ALL COMMUNICATIONS
MUST NOW BE
ADDRESSED—
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TRANSPORT APPLIANCE WORKS,
SMETHWICK,
BIRMINGHAM.

LONDONDERRY GAS COALS
FROM THE
MARQUIS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.
Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.

For Prices and Particulars, apply to
S. J. DITCHFIELD,
SEAHAM HARBOUR, COUNTY OF DURHAM.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for
CANNEL & COAL.

TYNE BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	17·8 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

For Prices and complete Analysis, apply to
THOS. W. DANCE & SONS,
Coal Owners, Newcastle-on-Tyne;
OR
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12, John Street, Adelphi, London, W.C.

MOBBERLEY & PERRY
STOURBRIDGE.
Manufacture & supply best quality of
Gas Retorts (SEGMENTAL, HORIZONTAL, or INCLINED.)
Special Bricks & Blocks for GENERATOR & REGENERATOR FURNACES.
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Contractors for the erection of Retort-Benches complete.
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BRIDGE HOUSE, 181, QUEEN VICTORIA STREET, E.C.

WILLEY & CO.,

GAS ENGINEERING CONTRACTORS,

EXETER,

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For **COIN METERS,** their Patent Automatic is admitted to be one of the best and most reliable in the Market. Largely used in the Metropolis.

For **GAS-FITTINGS,** Registered Designs in Extensive Variety.

Manufacturers of the **LIVESEY WASHER.**

Agents for the **MAXIM CARBURETTOR.**

New Works, 5 acres in extent, recently opened in the City of Exeter for the Manufacture of every kind of Apparatus used in the Production, Distribution, and Sale of Gas.

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ESTABLISHED 30 YEARS.

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MESSRS. HUMPHREYS & GLASGOW

Have constructed their EUROPEAN type of

CARBURETTED WATER-GAS PLANT

At the following Gas-Works:—

Copenhagen	700,000 Cub. Ft.	Liverpool	2,500,000 Cub. Ft.
Belfast	1,700,000 ,,	Brighton	1,250,000 ,,
Glasgow	300,000 ,,	Bath	1,000,000 ,,
Brussels	700,000 ,,	Preston	1,500,000 ,,
Santiago	400,000 ,,	Southport	750,000 ,,
Swansea	700,000 ,,	New York	1,000,000 ,,
Tottenham	600,000 ,,	Newburgh, N.Y.	350,000 ,,

And have now under Contract:—

Belfast (Second Contract)	3,500,000 Cub. Ft.	Manchester	3,000,000 Cub. Ft
Edinburgh	2,000,000 ,,	Brussels (Second Contract)	700,000 ,,
Tottenham (Second Contract)	750,000 ,,	St. Joseph, Mo.	750,000 ,,
Winchester	200,000 ,,	Holyoke, Mass.	500,000 ,,
Hoylake	125,000 ,,	Shanghai	225,000 ,,

In addition to which the previous Installations of The Gaslight and Coke Company under this System have a total capacity of 10,000,000 cubic feet per diem.

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BEST LIGHT AT LOWEST COST.

We beg to advise our numerous friends and customers that the Champion Incandescent Gas-Burner still holds the field, and that our sales are increasing daily, notwithstanding the threats of our competitors.

Mantles are sold in any quantity without restriction for use of particular kinds, and are very durable.

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Telegraphic Address: "PUTZ, LONDON."

Several large Show-Rooms will shortly be opened in different Districts. All Agents and Buyers are fully indemnified against Law Proceedings. A few more Agents wanted in several Districts.

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GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.

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INCANDESCENT SPIRIT LAMPS.

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RETORTS AND FIRE-BRICKS.

BEST QUALITY.

KING BROTHERS, STOURBRIDGE.

[See Illustrated Advertisement, April 7, p. 780.]

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GAS ENGINEERS,

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R. LAIDLAW & SON,

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ALL SIZES.

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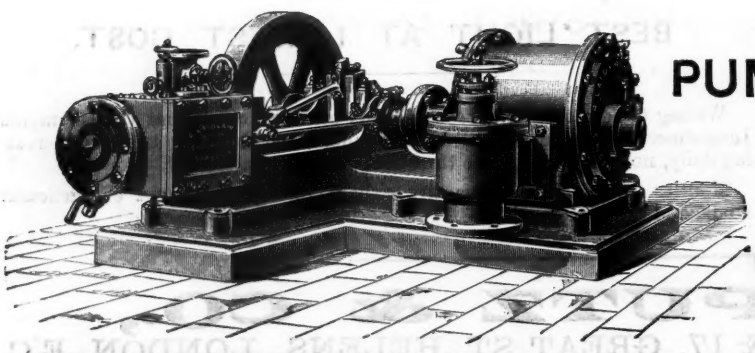
PUMPING-ENGINES.



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ALL KINDS OF

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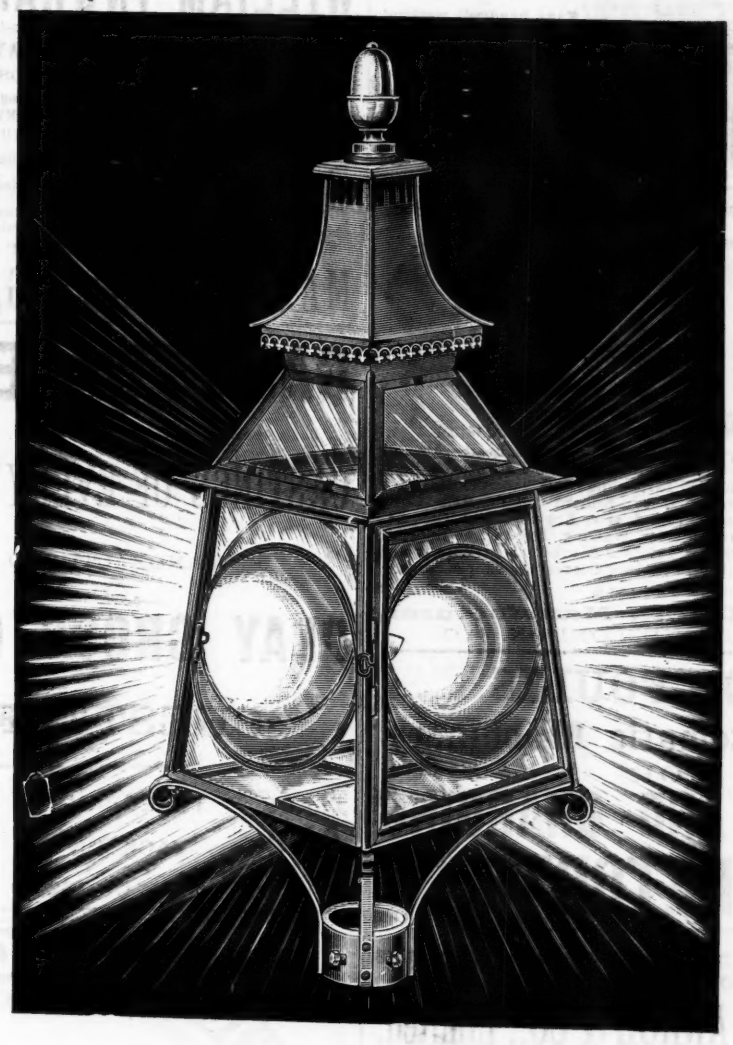
"LOFTUS"

PATENT STREET-LANTERNS

100 PER CENT. MORE LIGHT CAN BE OBTAINED FROM ANY FLAME BY USING THIS LANTERN INSTEAD OF THOSE NOW USED.



PUBLIC BODIES, CORPORATIONS, AND GAS COMPANIES CAN SAVE 50 PER CENT. BY USING THIS LANTERN FOR STREET LIGHTING.

Can be fitted for OIL where required.

No. 420 G.

FIRST COST LITTLE MORE THAN ORDINARY LANTERNS.

Exceedingly Brilliant Light in direction of Lenses, Lights Footway all along between Lamps.

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Or from London Agent: J. JONAS, 38, Lime Street, E.C., where a Specimen Lamp can be seen.

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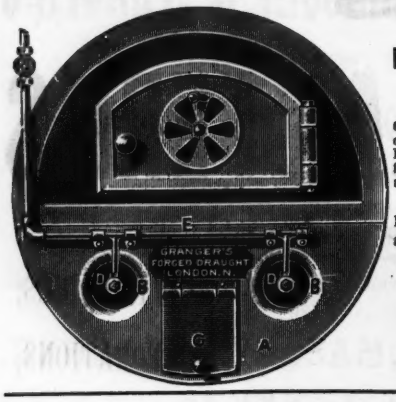

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Can be applied to any type of Boiler, and Burns all kinds of Cheap Fuel, Slack, Smudge, Pan Breeze, &c., also gives a large increase of Steam.

Many hundreds working at the leading Collieries, Mills, Factories, &c., &c.

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STOKE NEWINGTON,
LONDON, N.

Gas-Bags for Mains. High Water-Boots. Woollen Miners' Jackets.

Delivery and Suction Hose, Gutta-Percha Acid Bottles, Leather Driving Bands, Woven Canvas Hose for Fire-Engines, Wedge and Square Gas-Bags, Air and Water Beds for Invalids, Oil Tarpauling Coats, Trousers, Hats, &c., Squeegees for cleansing Pavements, &c., Billiard and Bagatelle Cush, Tricycle Tyres, Leather Hose, Cotton Waste, Engine Cloths, Oils, &c., India-rubber Waterproof Garments for Walking, Driving, or Sporting Wear, Diving and Wading Dresses, Printers' Blankets, Iron Wheels and Rollers covered with India-rubber. Stokers' Gloves, 14s. 6d. per dozen.

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Patent Automatic Machinery
FOR
DRAWING AND CHARGING GAS-RETORTS.

Full Particulars may be obtained from the Sole Makers,

SIR WILLIAM ARROL & CO., Limited,
GLASGOW.

[See Illustrated Advertisement, April 7, p. 736.]

The Climax of Regenerative Gas Lighting!!

THE
"VERTMARCHE"
A 280-CANDLE POWER PLAIN IRON LAMP,
CLASS A— **55/-**
LIGHT for LIGHT less than half the price of any other Regenerative Lamp.
Manufactured in England.

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PARTICULARS AND PRICES FREE. AGENTS WANTED.

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Established 1860.

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Incorporated with the Leeds Fire-Clay Company, Ltd.,
WORTLEY FIRE-CLAY WORKS,
Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—
1. Smooth interior, preventing adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

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TRADE	TELEGRAMS:	LONDON OFFICE:
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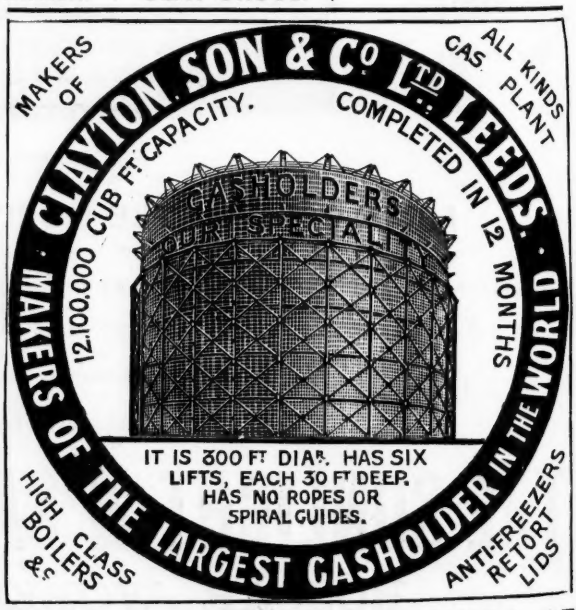
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ALL KINDS GAS PLANT
12,100,000 CUB FT CAPACITY.
COMPLETED IN 12 MONTHS
GASHOLDERS OUR SPECIALITY
IT IS 300 FT DIAR. HAS SIX LIFTS, EACH 30 FT DEEP. HAS NO ROPES OR SPIRAL GUIDES.
MAKERS OF THE LARGEST GASHOLDER IN THE WORLD
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Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

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IMPROVED

Sulphate of Ammonia Apparatus.

The most successful and approved Apparatus known up to the present time.

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The Apparatus has been supplied to the following Firms—

BURT BOULTON, & HAYWOOD, SILVERTOWN, and ELING.
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PELOUZE & AUDOUIN'S

PATENT MECHANICAL CONDENSER.

Over 292,000,000 Cubic Feet of Gas per Day is passing through about 550 of these Machines.

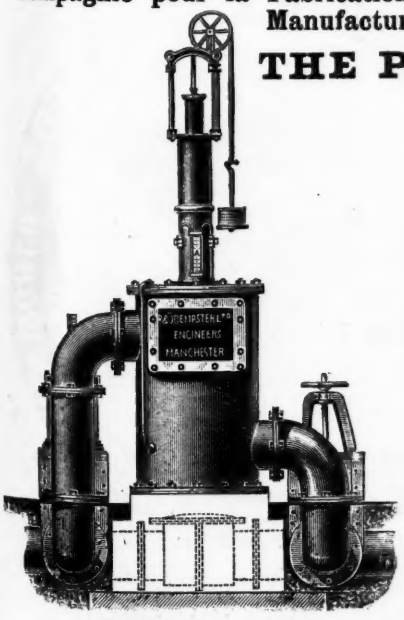
Messrs. R. & J. DEMPSTER, Limited,

HAVE PLEASURE IN ANNOUNCING THAT THEY HAVE MADE ARRANGEMENTS WITH THE

Compagnie pour la Fabrication des Compteurs et Materiel d'Usines a Gaz, of Paris, to Manufacture and Sell in this Country and the Colonies,

THE PELOUZE & AUDOUIN CONDENSER,

According to P. AUDOUIN'S LATEST PATENTS.



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This Apparatus is in very general use in most of the Gas-Works on the Continent and in America; over **550** being in use in different parts of the World for condensing and arresting all Tar Particles and Vapours from the Gases from Coal, Oil, and Wood.

The large number in use is sufficient proof of its utility. By the almost complete elimination of Tar, which is effected to the extent of 99·7 per cent., it facilitates Purification in the Purifiers, by preventing the clogging or obstruction of the Purifying Materials, which, in consequence, last much longer; thus effecting a Saving both in Materials and Labour.

So effective is this Apparatus that a piece of white paper placed over a Test-Tap on the Inlet of the Machine is immediately covered with Tar, whilst on the Outlet the white paper remains perfectly clean.

The Machines are made in the following sizes, for Works producing per 24 hours—

	Cubic Feet.		Cubic Feet.
0	35,000	5	500,000
1	70,000	6	700,000
2	140,000	7	1,240,000
3	210,000	8	1,750,000
4	350,000	For larger Makes, two Machines are recommended.	

For Prices and further Particulars, apply to the Sole Makers—

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HEATHCOTE GAS COAL.

RICH IN ILLUMINATING POWER AND YIELD OF GAS.
ABOVE THE AVERAGE IN WEIGHT AND QUALITY OF COKE.
MAINTAINS A HIGH STANDARD IN RESIDUALS.

THE GRASSMOOR Co., Ld., CHESTERFIELD,

GASEOUS FIRING A SPECIALTY.

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SOLE AGENTS For "HISLOP'S" PATENT REGENERATIVE FURNACES. FOR ENGLAND, WALES & ABROAD.

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SEAL-REGULATING
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Wellington, Nelson, and Market Street Works,
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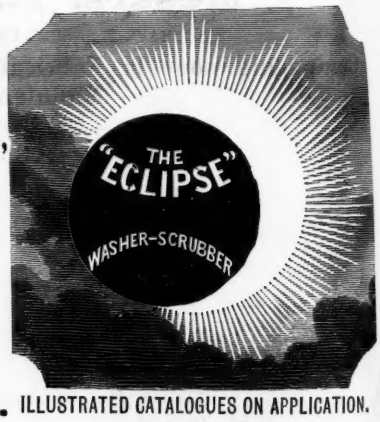
RETORT-FITTINGS,
CONDENSERS,
PURIFIERS, WITH PLANED JOINTS.

GASHOLDER TANKS,
COLUMNS, GIRDERS,
LAMP-POSTS,

And all Kinds of Gas-Making Apparatus and General Ironwork.



GAS and WATER VALVES and MAINS. ILLUSTRATED CATALOGUES ON APPLICATION.

ALSO SOLE MAKERS OF

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		CAPACITY, CUB. FT.
Sheffield United Gas Company	2 Machines	1,500,000 each.
Do. do.	2 ,,	4,000,000 ,,
Halifax Corporation . . .	2 ,,	3,000,000 ,,
Keighley Corporation . .	2 ,,	1,000,000 ,,

		CAPACITY, CUB. FT.
Manchester Corporation. .	2 Machines	4,000,000 each.
Do. do. . .	1 Machine	3,000,000
Rochester, Chatham, & Strood . . .		1,000,000
Do. do. . . .		1,500,000

CONTRACTORS TO HER MAJESTY'S GOVERNMENT.

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